Itowa

USER MANUAL

SYNTHESIZED SETS

MULTI-FREQUENCY SYNTHESIZED SETS

BOGGY, COMBI, BETON AND WINNER

Versions:

- Conventional
- GCFI

ITOWA

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1. INTRODUCTION

This manual is a guide to the correct use of the range of ITOWA multi-frequency remote control sets.
These sets have been specially designed for the wireless remote control of all types of electromechanical machinery.
FM frequency and FFSK codification are used for the radio transmission of control signals. The most advanced technology and the latest generation microprocessors have been incorporated in the electronic design. This means total safety when using the radio control.
To avoid unwanted manoeuvres, the system is provided with several safety mechanisms that are described further on. Manoeuvres are immediately blocked if any anomalies are automatically detected.
The system operates in the UHF band, in the frequencies between 433.050 and 434.775 MHz or between 868.000 and 870.000 MHz as stipulated in the telecommunications legislation of the I-ETS 300 220.
Please ask ITOWA for other certifications.

GCFI VERSION

The GCFI *(Intelligent Changing Frequency Management)* has been designed to enable an intelligent change of non-occupied frequency, always automatically and at random. This allows avoiding interferences that can cause continuous problems during the equipments performance.

NOTA: ALL INFORMATION INCLUDED IN THIS MANUAL WITHREGARDS EITHER TO CHANGE OF FREQUENCY OR TO WORKING CHANNEL IS NOT VALID FOR GCFI VERSIONS.

FULLY CHARGE THE BATTERIES BEFORE USING THE EQUIPMENT FOR THE FIRST TIME

2. GENERAL RULES FOR THE CORRECT AND SAFE USE OF THE RADIO CONTROL

For maximum safety when handling the radio control, the user must follow the rules described in this manual.

Whenever the crane has to be manoeuvred, the radio control operator must be in a place where he can view the whole manoeuvre being performed. If this is not possible, he should place himself where he can see as much of the manoeuvre as possible, and coordinate with another person when he cannot see properly. Never perform a manoeuvre which may be partially uncontrolled.

Do not leave the radio control transmitter on the ground or on metal blocks. If you must do so, activate the emergency stop (STOP BUTTON) of the radio control and turn the key/switch to the OFF position or lock the keyboard if it is activated (see the section *Procedure to lock the keyboard*).

At the end of the working day, or if the radio control operator has to leave the radio control, he should activate the emergency stop (STOP BUTTON) of the radio control, turn the key or selector switch to the OFF position, place the battery in the charger for recharging and turn off the crane.

Procedure to lock the keyboard

The equipment can have the option of the keyboard lock on the transmitter, by means of a system of sequential lock/unlock of buttons. This system is similar to the one used to lock telephones.

To lock the keyboard press the start button 5 times in less than 3 seconds, with the STOP BUTTON pressed. Both leds and will light up for 3 seconds.

To unlock the keyboard, repeat the same operation, that is, press the start button 5 times in less than 3 seconds, with the STOP BUTTON pressed. The operation will also be indicated in the same way, that is, both leds and will light up for 3 seconds.

In case the start button is pressed while the keyboard is locked, both leds will blink alternatively.

3. DESCRIPTION OF THE SET

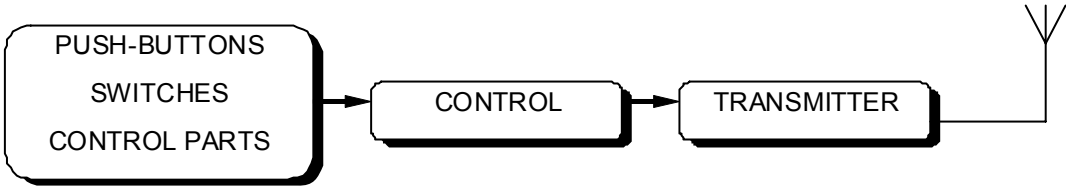
The remote controls of the SYNTHESIZED range are made up of the following elements:

- TRANSMITTER
- RECEIVER
- BATTERIES
- CHARGER

3.1. TRANSMITTER

This is a sealed push-button box (IP 65 protection) in highly resistant plastic material. The manoeuvre push-buttons and display leds are in the front part. The housing for interchangeable batteries is provided at the back.

As indicated the block diagram (Fig. 3.1), the transmitter consists of three parts: push-buttons, control circuit and UHF transmitter.



The following diagram shows the GCFI transmitter.

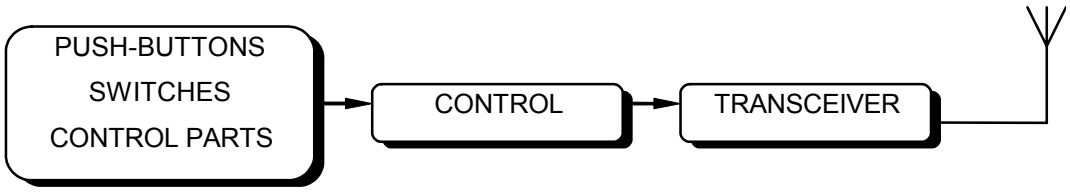


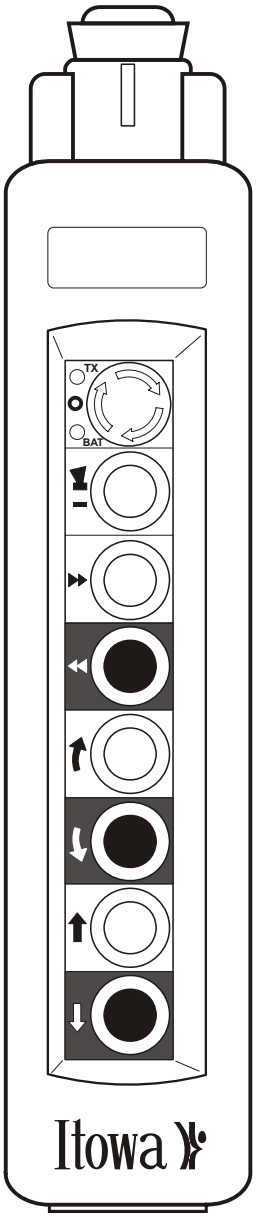
Fig. 3.1 Block diagram of the transmitter

Orders from the push buttons are picked up by the microprocessor, which draws up the FFSK signal adding direction and control codes, and injects it to the UHF transmitter This transmitter incorporates the signal of this order to the carrier frequency, which after filtering, will be transmitted by the antenna.

In GCFI equipments, the transmitter becomes a transceiver. This enables a bidirectional communication with the receiver.

3.1.1. BOOGY TRANSMITTERS

• TOWER CRANE



MANOUVRE

STOP

START-HORN

*GVE

RAISE

LOWER

RIGHT

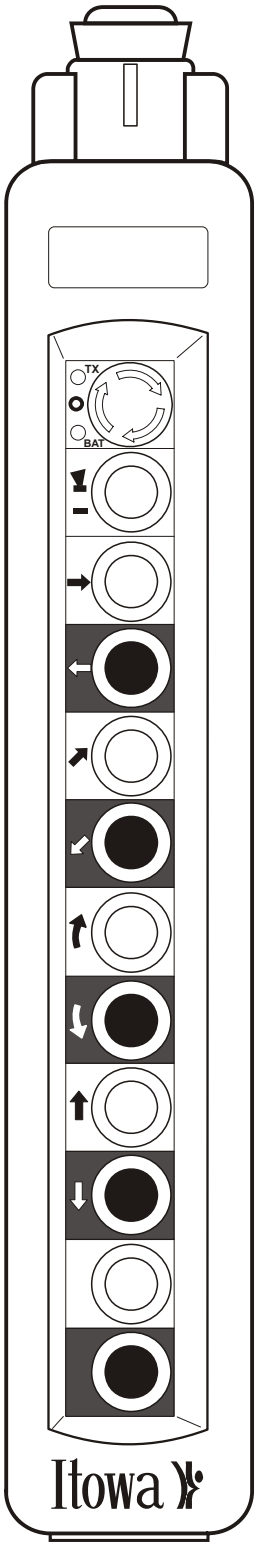
LEFT

TROLLEY BACKWARDS

TROLLEY FORWARDS

*GVE THIS RELAY WILL BE ACTIVATED ONLY WHEN THE SET IS ON AND WITH ANY OF THE LIFTING BUTTONS ON

Fig. 3.2 BOGGY 8



MANOUVRE

STOP

START-HORN

LOWER

RAISE

CRANE NORTH

CRANE SOUTH

RIGHT

LEFT

TROLLEY BACKWARDS

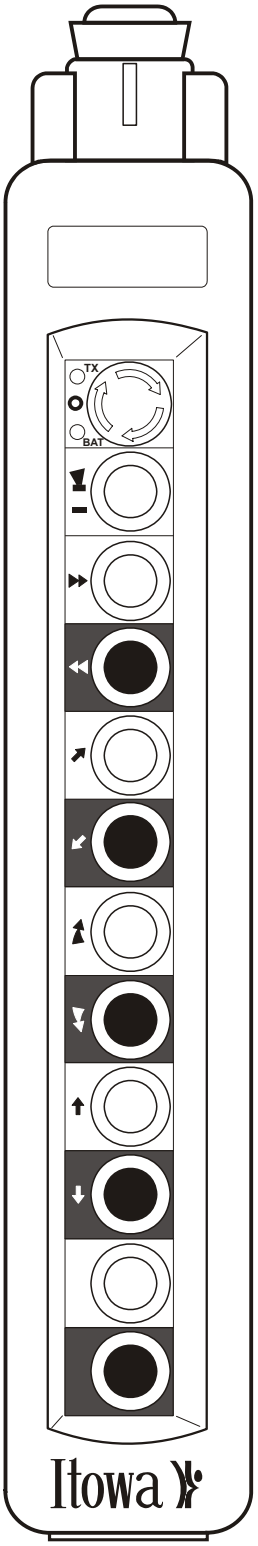
TROLLEY FORWARDS

AUXILIARY 1

AUXILIARY 2

UNIF0001

Fig. 3.3 BOGGY 12



MANOUVRE

STOP

START-HORN

LOWER

RAISE

CRANE NORTH

CRANE SOUTH

RIGHT

LEFT

TROLLEY BACKWARDS

TROLLEY FORWARDS

AUXILIARY 1

AUXILIARY 2

Fig. 3.4 BOGGY 12/4

• OVERHEAD CRANE

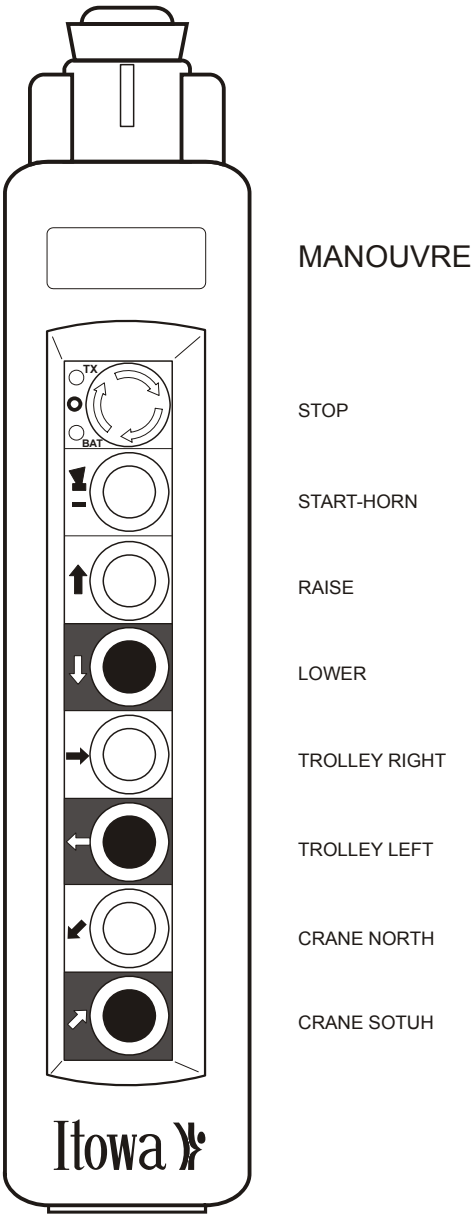


Fig. 3.5 BOGGY 8

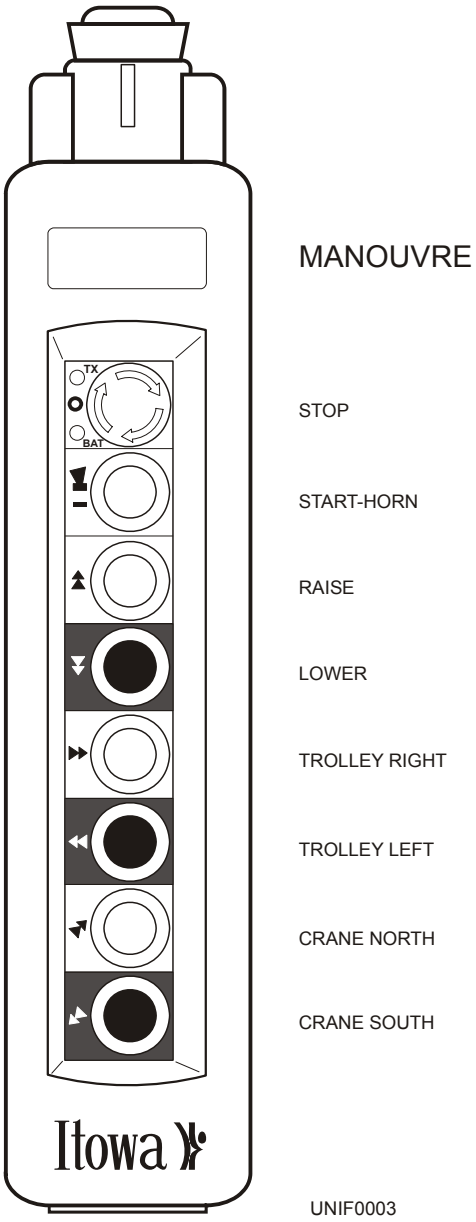


Fig. 3.6 BOGGY 8/6

3.1.2. WINNER TRANSMITTER

With regards to the other Itowa transmitters, this transmitter has more leds to indicate the different status of functioning. Apart from the other differences described all through the manual, the main differences of the Winner transmitter with regards to the rest of Itowa equipments are the following ones:

- When placing the battery, the transmitter tests its leds. They light sequentially one by one.
- Led :
  - ▪ When it lights, it indicates that the transmitter is switched on.
  - ▪ In GCFI models, when the led does not light it means that it is receiving data. Since there is a bidirectional communication with the receiver, when the led blinks several times quickly, it shows that communication works properly.
  - ▪ In the same version GFCI the led keeps lighted if the user tries to activate one manoeuvre and there is no established communication with the receiver.
- Led S1
  - ▪ In case this led blinks constantly after the test of leds, this indicates that there is an error in the configuration memory of the E2prom.
  - ▪ For special applications this led may have associated functions.
- Led S2 is only used for special applications.
- Led S3.
  - ▪ In case of pressing the start button while pressing another manoeuvre button, this led will blink.

The diagrams listed below show different configurations according to the applications.

• TOWER CRANE

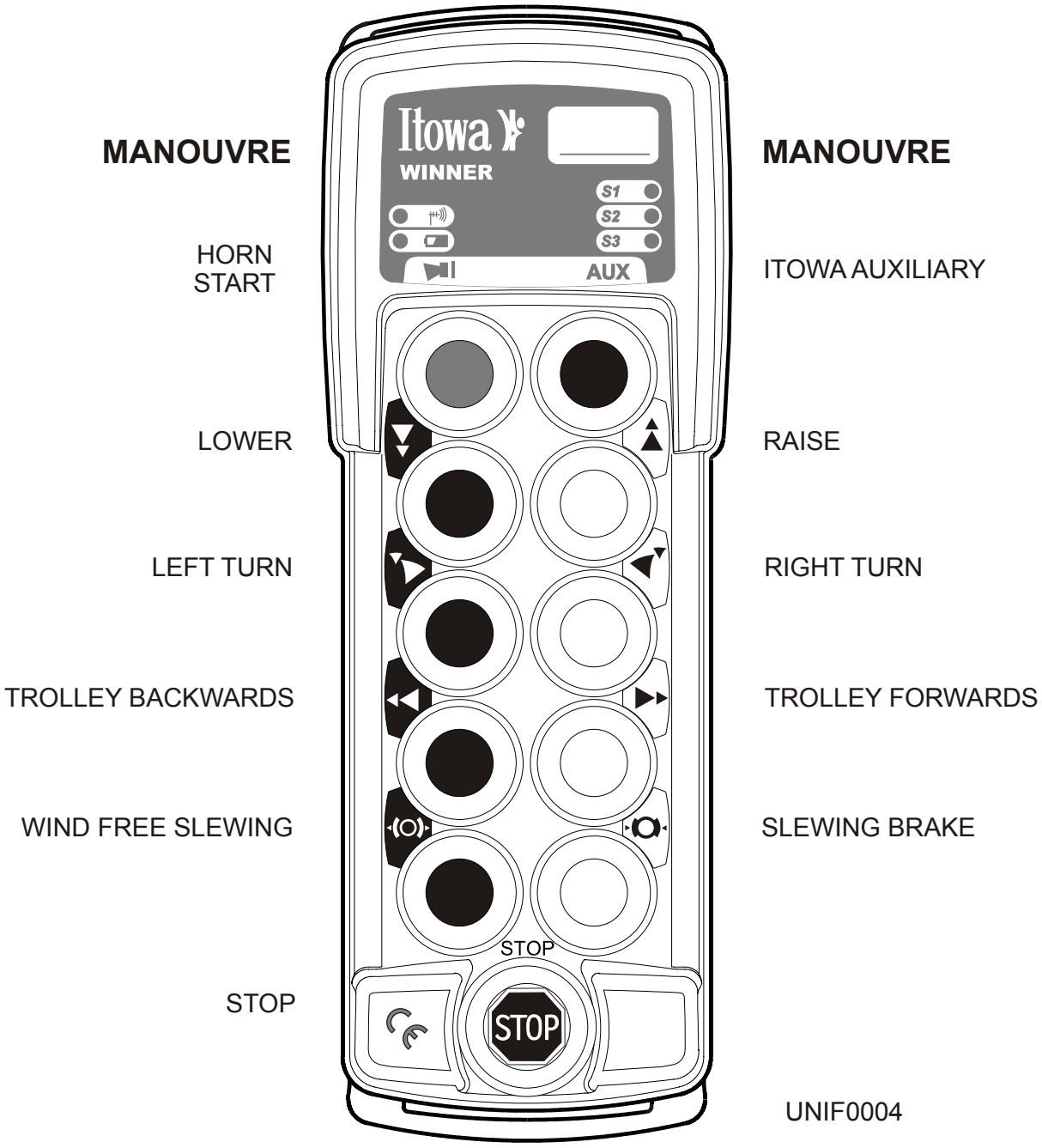


Fig. 3.7 WINNER TOWER CRANE

• OVERHEAD CRANE

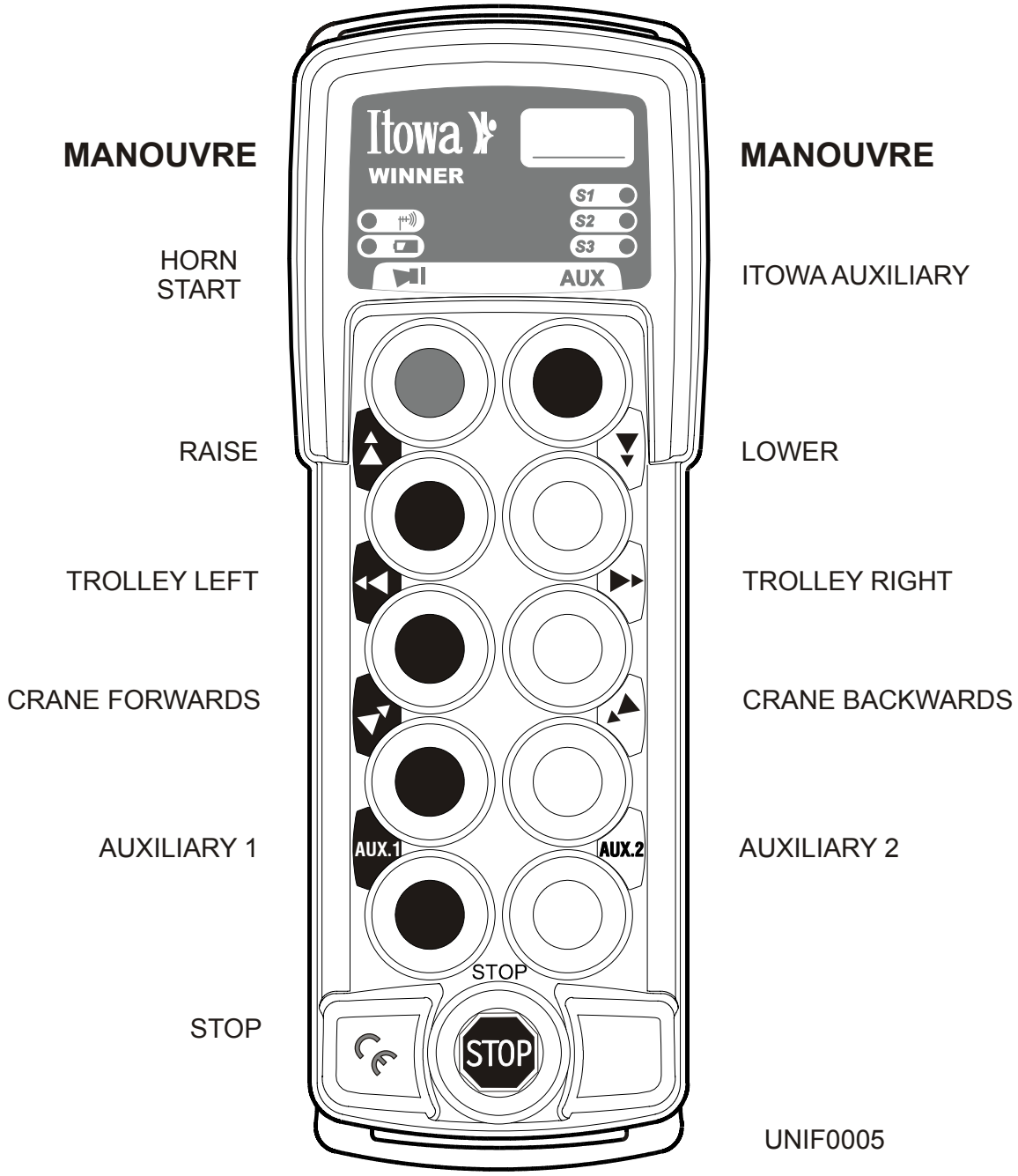


Fig. 3.8 WINNER OVERHEAD CRANE

3.1.3. COMBI TRANSMITTERS

• TOWER CRANE

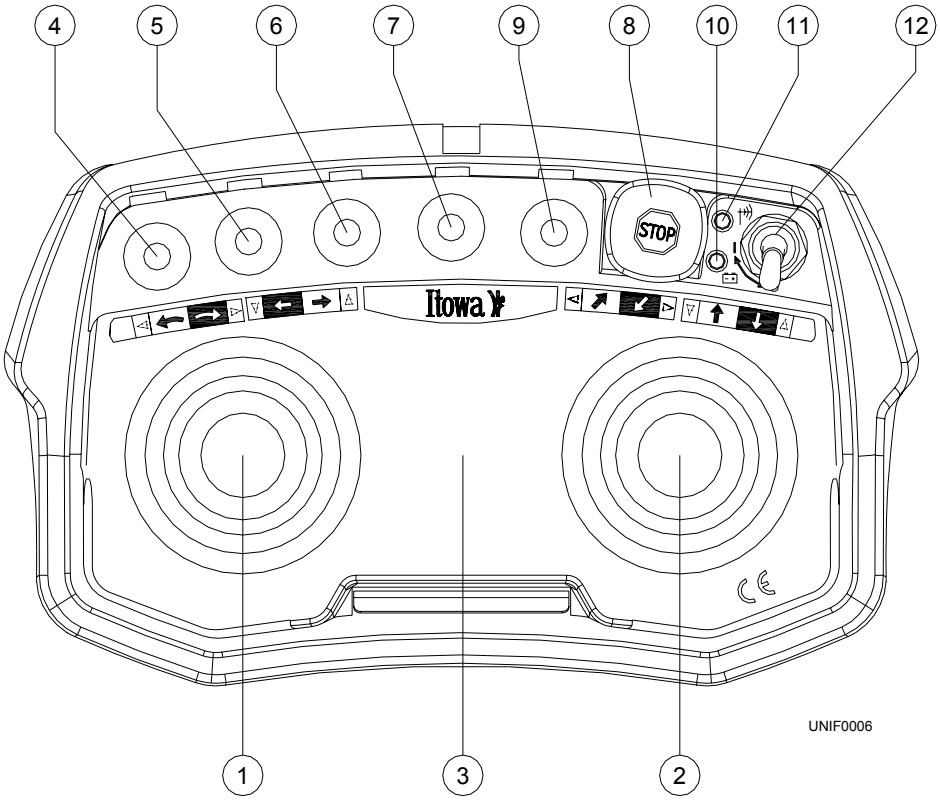


Fig. 3.9 COMBI TRANSMITTERS FOR TOWER CRANE

(The manoeuvres indicated in the table are a guideline only. Manoeuvres may change from one order to another in accordance to customers needs)

TOWER CRANE					
Nº	**MEANING**		**Nº**	**MEANING**	
1	Joystick	Right Left Trolley Backwards Trolley Forwards	2	Joystick	Crane North Crane South Raise Lower
3	Combi-Synthesized Box		4	Slewing brake push button	
5	Auxiliary push button		6	Horn push button	
7	Start button		8	Emergency stop button	
9	On/Off traveling push button*		10	Low battery led	
11	Transmitter led		12	On/Off selector switch	

* As a safety measure and bearing in mind the danger of the manoeuvre, switch nº 9 for tower crane controls, must be in the ON position to enable the Travelling manoeuvre.

• OVERHEAD CRANE

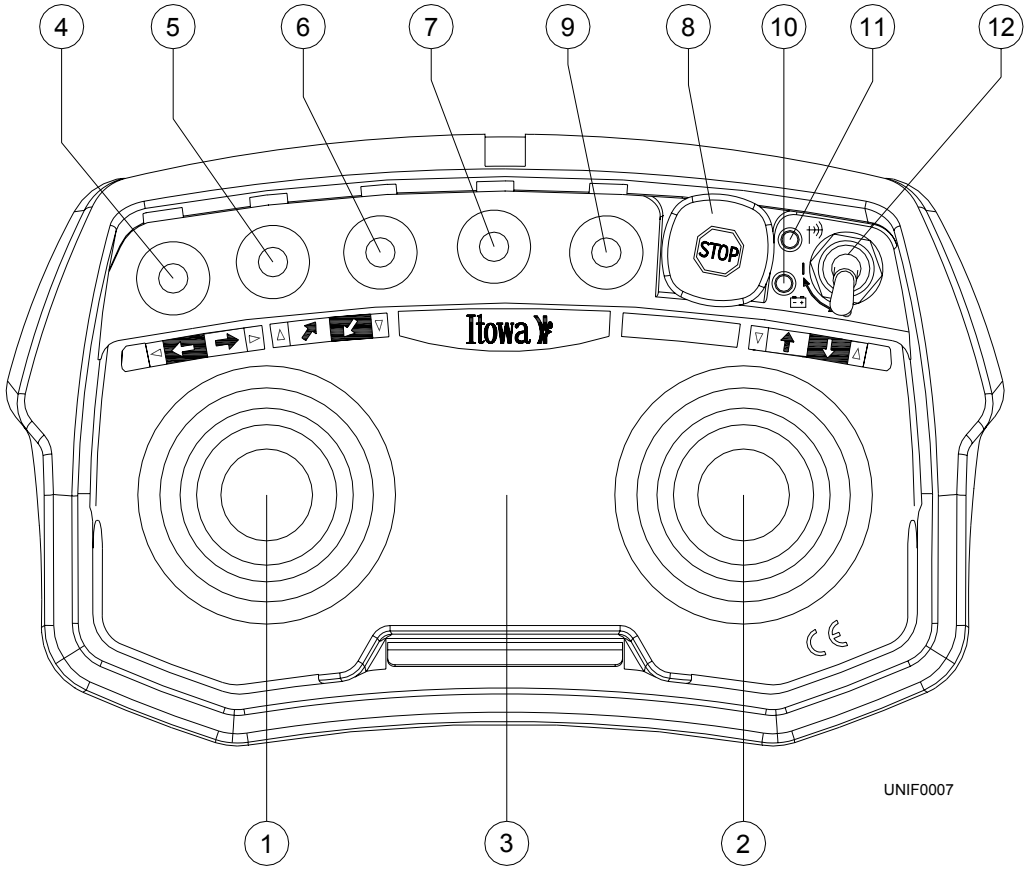


Fig. 3.10 COMBI TRANSMITTER FOR OVERHEAD CRANE

(The manoeuvres indicated in the table are a guideline only. Manoeuvres may change according to customer needs)

OVERHEAD CRANE					
Nº	**MEANING**		**Nº**	**MEANING**	
1	Joystick	Trolley Right Trolley Left Crane Forwards Crane Backwards	2	Joystick	Lower Raise
3	Combi-Synthesized Box		4	Auxiliary push button	
5	Auxiliary push button		6	Horn push button	
7	Start button		8	Emergency stop button	
9	Null		10	Low battery led	
11	Transmitter led		12	On/Off selector switch	

3.1.4. BETON TRANSMITTERS FOR CONCRETE PUMPS

• 3 JOYSTICKS TRANSMITTER

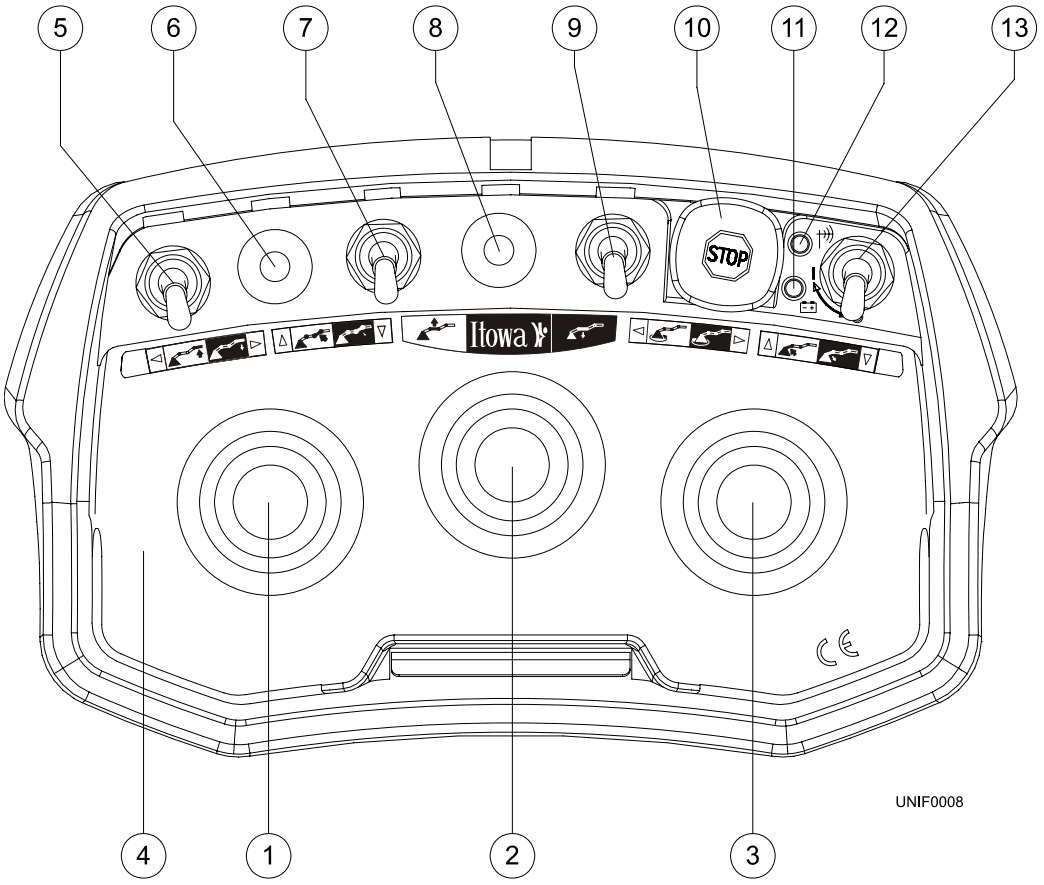


Fig. 3.11 3 JOYSTICKS BETON TRANSMITTER

CONCRETE PUMP					
Nº	**MEANING**		**Nº**	**MEANING**	
1	Joystick	Raise arm 4 Lower arm 4 Raise arm 3 Lower arm3	2	Joystick	Lower arm 2 Raise arm 2
3	Joystick	Right Left Raise arm 1 Lower arm 1	4	Beton-Synthesized button	
5	Returnable switch (increases and reduces r.p.m)		6	Start push button	
7	Pumping/reverse retornable switch		8	Horn push button	
9	Auxiliary switch		10	Emergency push button	
11	Low battery led		12	Transmission led	
13	ON/OFF selector switch				

• 2 JOYSTICKS TRANSMITTER

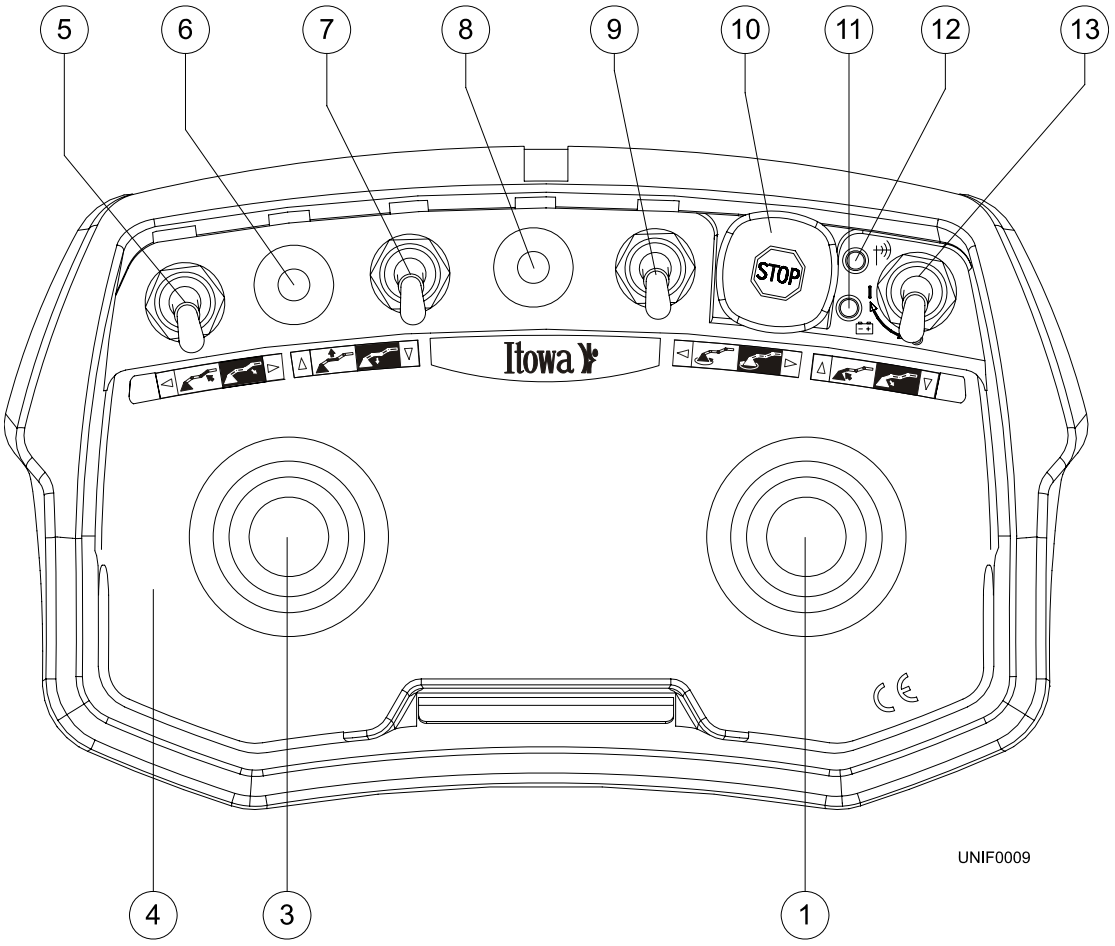


Fig. 3.12 2 JOYSTICKS BETON TRANSMITTER

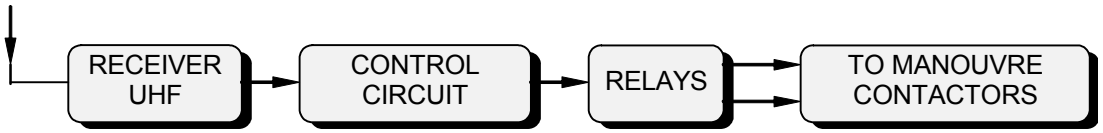
(The manoeuvres indicated in the table are a guideline only. Manoeuvres may change from one supply to another in accordance with customers needs)

CONCRETE PUMP					
Nº	**MEANING**		**Nº**	**MEANING**	
1	Joystick	Right Left Lower arm 1 Raise arm 1	3	Joystick	Raise arm 2 Lower arm 2 Raise arm 3 Lower arm 3
4	Beton-Synthesized Box		5	Returnable switch (increases and reduces r.p.m)	
6	Start button		7	Pumping/reverse retornable switch	
8	Horn push button		9	Auxiliary switch	
10	Emergency push button		11	Low battery led	
12	Transmission led		13	ON/OFF selector switch	

3.2. RECEIVER

The receiver unit consists of a cabinet in which the various electronic systems are located to receive orders and activate / deactivate the corresponding relays for each manoeuvre of the crane.

The receiver unit can be divided into three blocks (Fig. 3.13, UHF receiver, control circuit and relay circuit.



In GCFI versions, the block diagram is as follows,

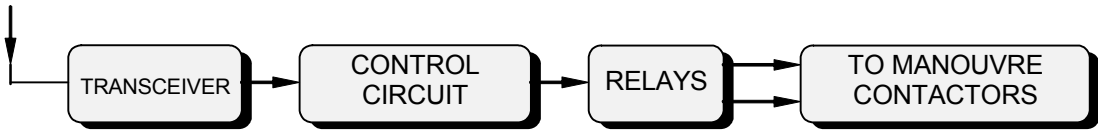


Fig.3.13 Block Diagram of the receiver

The signal received by the antenna is injected to the receiver, which supplies a low frequency signal in FFSK code to the micro-processor. The control module checks that the information received is free of errors, and then draws up the corresponding orders to activate the corresponding relay.

In GFCI equipments, the transmitter becomes a transceiver. This enables a bi-directional communication with the receiver.

In the event of anomalies in the working order of hardware or software, there are specific circuits in the control circuit, which deactivate the radio control work manoeuvres.

For greater safety, all surveillance circuits are doubled.

3.2.1. STANDARD RECEIVER

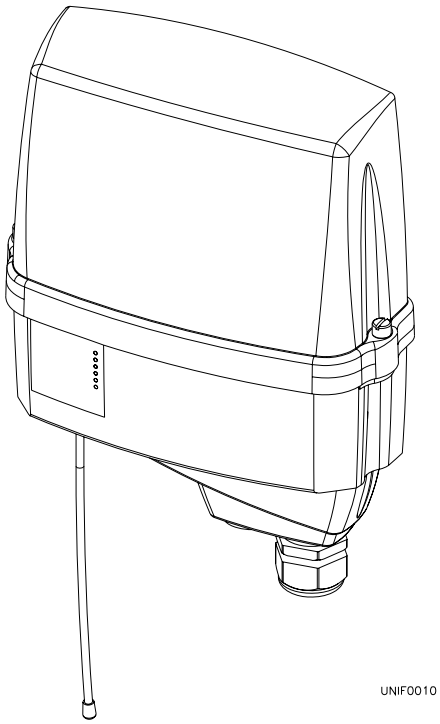


Fig. 3.14 Standard Receiver

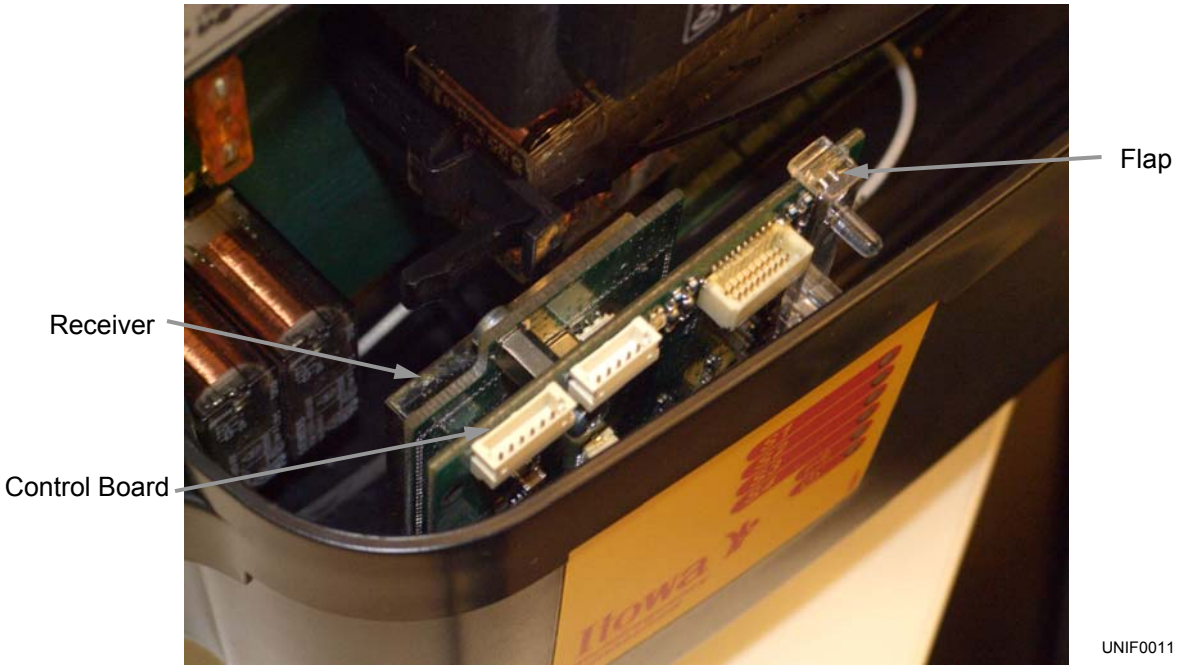


Fig. 3.15 Detail of the standard receiver

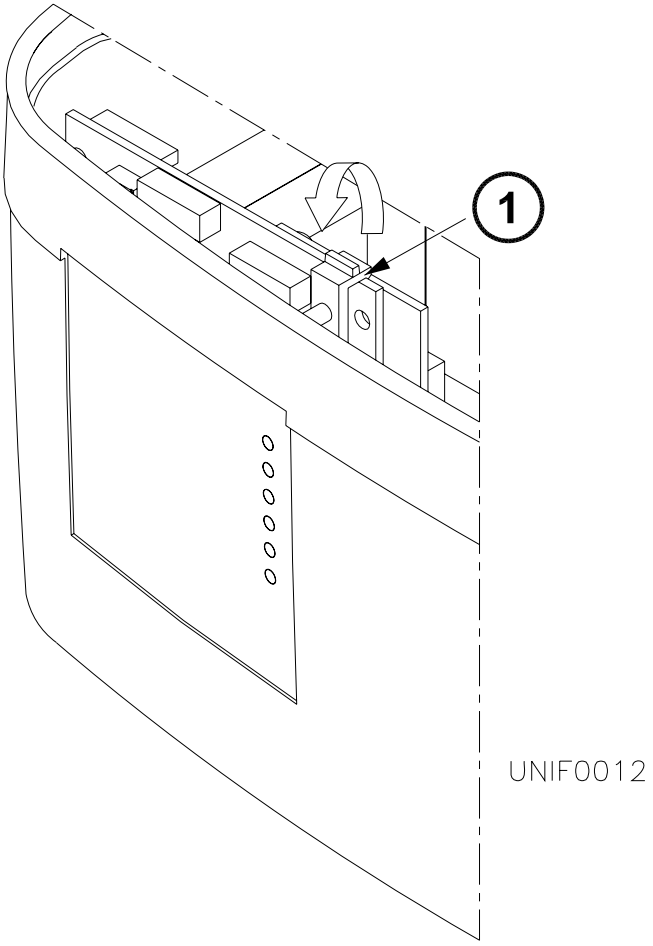


Fig. 3.16 Detail of the control board

Follow these instructions in order to take the control board out:

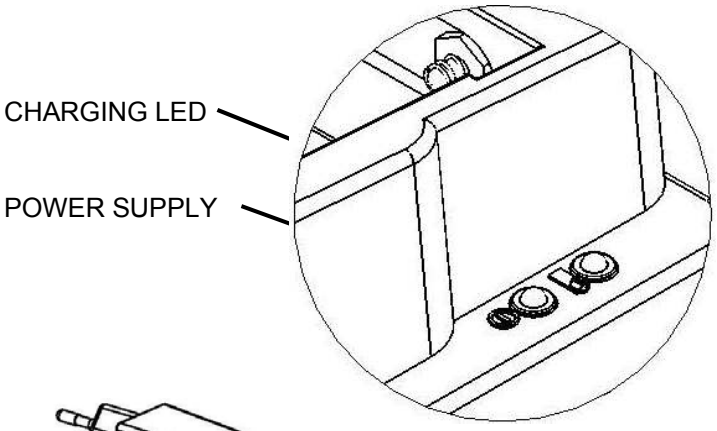
1. Raise the flap (1).
2. Take the control board out.

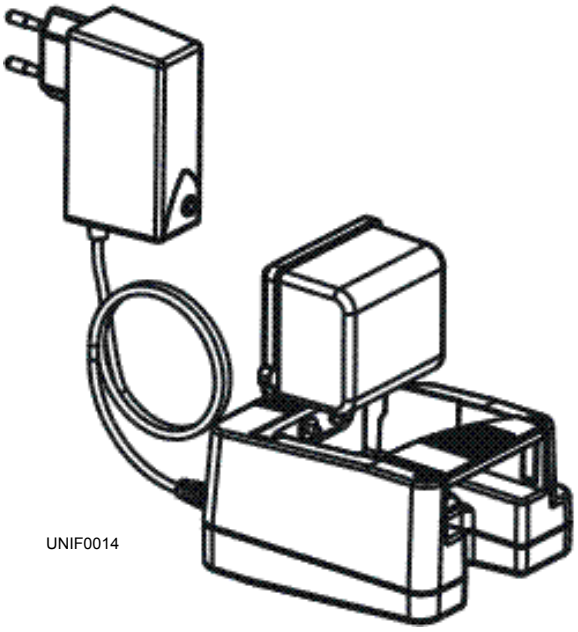
3.3. BATTERY CHARGER

The ITOWA battery charger can quickly and safely charge Ni-MH and Ni-Cd batteries. The batteries supplied are in Ni-MH, from which the charger extracts their maximum power. The charger is capable of detecting faulty batteries, short circuits or overheating, and can recuperate batteries that have been flat for a long period of time.

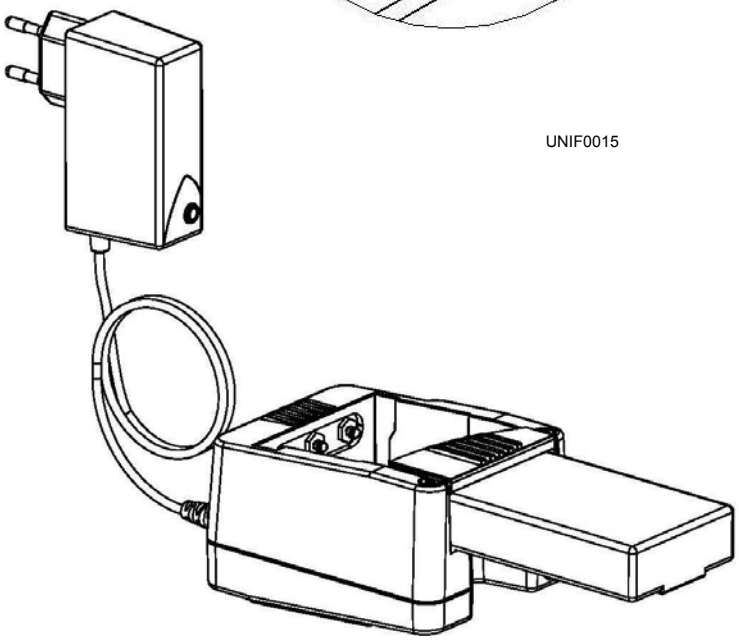
The charger has two display leds, one for power supply indicating that the unit is connected to the mains, and the other indicating that the batteries are being charged. When the battery is inserted, the charger starts charging without checking the battery for 20 minutes. After this time, the charger checks the state of the battery and charges accordingly for each battery. The end of the process is indicated when the charge display led turns off. Complete charging lasts less than 8 hours. For safety, the maximum charging time is limited to 12 hours.

Charging should be performed at a temperature between –10ºC and 50ºC. If, after the initial 20 minutes, pre-charging process, the charging led continues flashing, it means that charging is not being done correctly, either because the temperature, or because the battery is too flat. In this case, the charger will perform a slow safety pre-charging process in order to recondition the battery if possible, during with time the charging led will flash. Once this is over, it will continue with the normal charging process.





COMBI battery charger



BOOGY battery charger

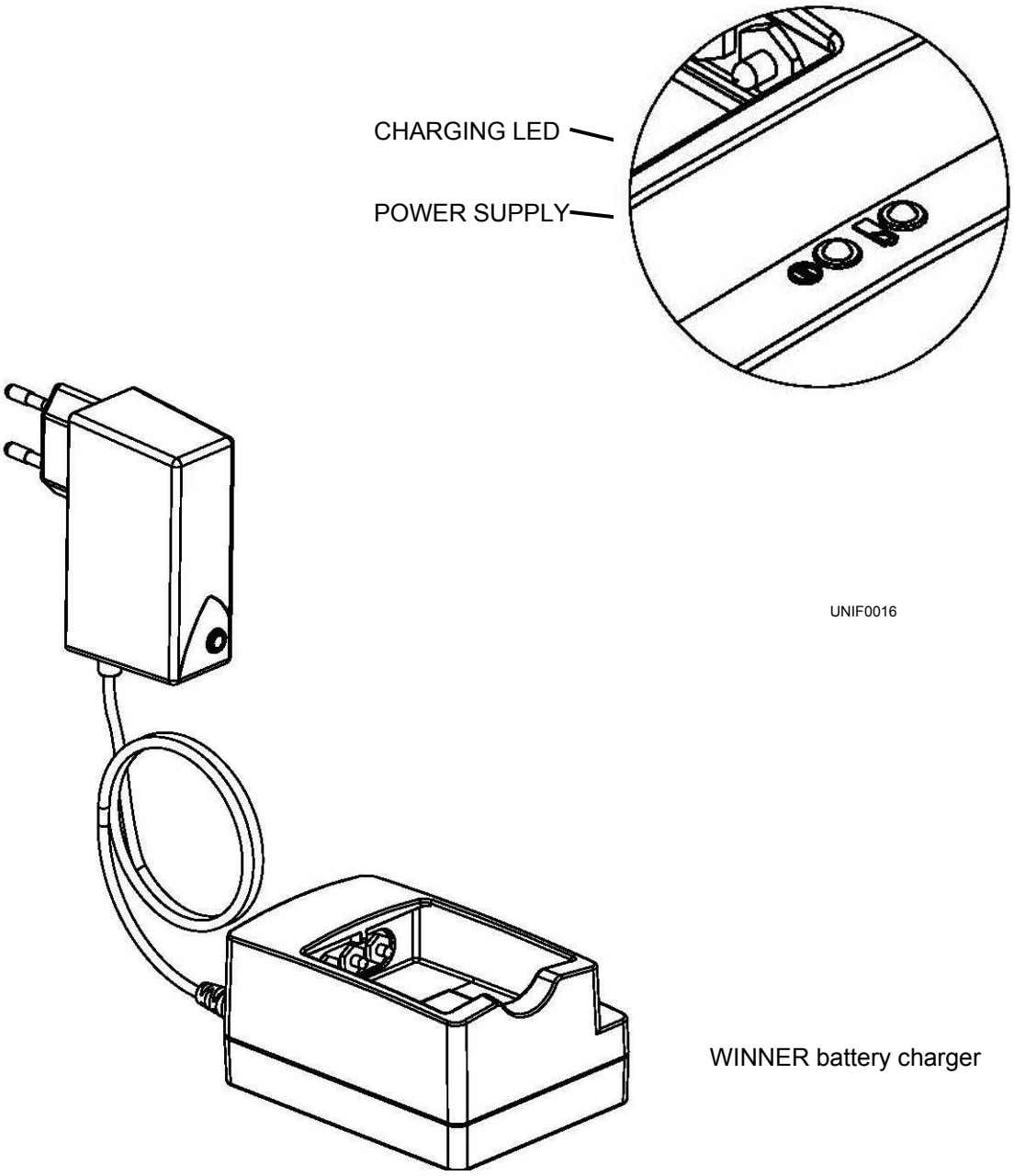


Fig. 3.17 Battery chargers

4. TECHNICAL SPECIFICATIONS

4.1. GENERAL SPECIFICATIONS

MANUFACTURER	INVESTIGATION TOTAL WARE
TYPE	MULTI-FREQUENCY
FREQUENCY	ISM-BAND
NUMBER OF ORDERS	Up to 40 (Optional up to 56)
POSSIBILITY OF WRONG MANOEUVRE	10^{-18}
HAMMING DISTANCE	≥6
PROGRAMMABLE CODE	16777216
ORDER RESPONSE TIME	<50 ms
ACTIVE EMERGENCY TIME	<50 ms
PASSIVE EMERGENCY TIME	1900 ms
RADIUS OF ACTION	90 meters

4.2. TRANSMITTER

Frequency bands:		434.050 to 434.775 MHz 868.000 to 870.000 MHz I-ETS 300 220
Channelling:		25 kHz
Modulation:		FM
Transmission Power:		10 mW P.R.A
Coding:		FFSK
Stability in frequency;		± 2.5 ppm (-30ºC to 70ºC)
Attenuation of harmonics		> 70 dB
Consumption in transmisión		< 80 mA
Consumption in stand-by		< 800 µA
Power supply:		Removable battery Ni-MH, 7.2 V; 1.5 A/h Winner: Removable battery NiMH, 3.6V; 2.3 A/h
Endurance:		11 hours + 10 minutes reserve (Conventional) 16 hours + 10 minutes reserve (GCFI) 24 hours + 15 minutes reserve (Winner GCFI)
Temperature range:		From -20ºC to +70ºC
Approximate weight: (without batteries)	COMBI / BETON	1,6 kg
	BOGGY 8	1,1 kg
	BOGGY 12	1,5 kg
	WINNER	0,6 kg
Weight of battery		200 g 121g Winner
Measurements	COMBI / BETON	272 x 167 x 142 mm
	BOGGY 8	400 x 80 x 65 mm
	BOGGY 12	535 x 92 x 65 mm
	WINNER	236 x 66 x 66 mm

4.3. RECEIVER

Frequency bands:		434.050 to 434.775 MHz 868.000 to 870.000 MHz I-ETS 300 220	
Sensitivity:		0.3 μV	
Image frequency rejection:		>65 dB (TBD in GCFI versions)	
Protection against intermodulation:		>65 dB (TBD in GCFI versions)	
Adjacent channel rejection:		>65 dB (TBD in GCFI versions)	
Relays:	Resistive load:	5 A + 5 A at 250 Vac or 30 Vdc	
	Inductive load ($\cos\phi$=0.4):	2 A at 250 Vac or 3 A at 30 Vdc	
	Maximum operation voltage:	380 Vac , 125 Vdc	
	Minimum admissible load:	10 mA at 5 Vdc	
Number of switchings:	Resisitve load:	10^6 manouvres 2 A at 250 Vac or 30 Vdc	
	Inductive load ($\cos\phi$=0.4):	10^6 manouvres 1.2A at 250 Vac or 30 Vdc	
Power supply:	48 Vac / 115 Vac / 230 Vac (-20% +15%) 12 Vdc / 24 Vdc (-20% +15%) EN 60047-5-1		
Max. Consumption:	0,9 A (48 Vac) / 0,5 A (115 Vac) / 0,2 A (230 Vac) 4 A (12 Vdc) / 2 A (24 Vdc)		
Connection:	By means of Itowa 48-pin connector		
Fuses:	Emergency stop manouvre	7,5 A	
Dimensions:	Outside:	374 x 274 x 126 mm	
Weight:	With fastening	4,20 Kg	
Protection	IP 65		
Fijación:	3mm dichromate steel Fastening: with bolts or magnetic		

4.4. ACCESSORIES

4.4.1. CHARGER TRANSFORMER (EXCEPT BETON

Power supply:	115 / 230 Vac – 15 Vdc
Consumption:	3,6 VA
Weight:	0,35 kg

Battery chargers of BETON sets do not have transformers and can be directly supplied with 12 to 24 Vdc.

4.4.2. BATTERY CHARGER

Power supply:	14 Vdc / 24 Vdc
Power:	6 VA
Charge intensity:	120 mA, 550 mA (Winner)
Charging time:	7 - 8 hours
Protection:	IP30
Dimensions:	90 x 105 x 65 mm (Universal) 75 x 95 x 50 mm (Winner)
Approximate weight:	0,2 kg

5. INSTALLATION AND START-UP

5.1. INSTALLATON OF THE RECEIVER

The receiver should be installed in an accessible location to be able to work on it easily.

ATTENTION: IT IS IMPORTANT TO PROPERLY CLOSE THE COVER OF THE RECEIVER TO ENSURE SEALING, AS WATER LEAKING INSIDE MAY DAMAGE THE RECEIVER. THE GUARANTEE DOES NOT COVER ANY BREAKDOWNS CAUSED BY INCORRECTLY CLOSING THE COVER.

Whenever possible, metal screens on the antenna should be avoided, in order to achieve a better radio link and avoid failures in communication.
Itowa cannot be held responsible for faulty installations

ATTENTION: THE FASTENING SET OF THE RECEIVER (METAL PARTS) MUST BE INSTALLED BEFORE FASTENING THE RECEIVER ITSELF (EXCEPT IN THE MAGNETIC FASTENING OPTION).

5.1.1. FASTENING PROCESS

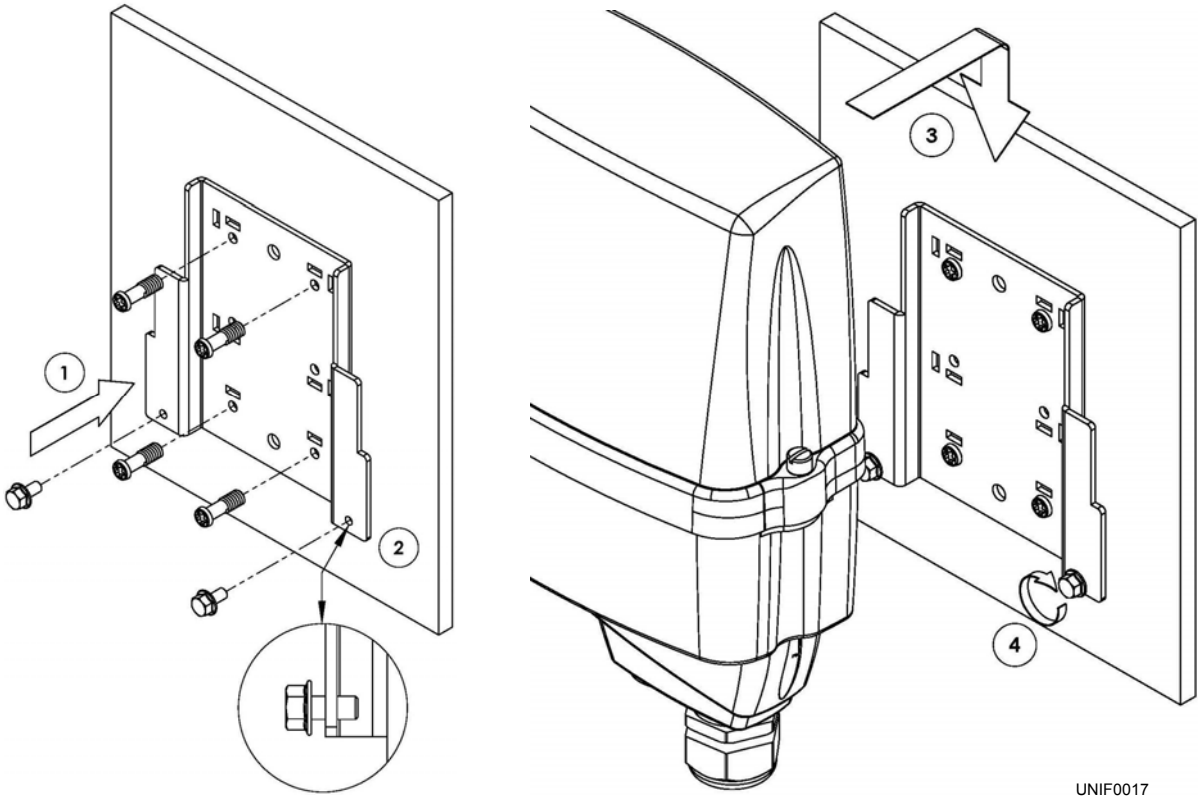


Fig. 5.1 Fastening

1. Assemble the fastening on a stable and sturdy support. The size of the support should be adequate for the fastening.
2. Place the fastening vertically, using the alternative holes to the two central holes, if necessary, as shown in figure (2).
3. Tighten the bolts (3) enough to support the weight of the unit, without bending the fastening.

Take special care if the support is an angle instead of a tube.

4. Thread the screws M6 DIN 6921 (4) on the fastening, leaving enough space to fit the fastening eye mountings of the set (5).
5. After assembling the fastening set on the machine (6), slide the receiver along the rails down to the end (7).
6. Finally, tighten the screws M6 DIN 6921 (8) with a no. 10 flat spanner.

5.1.2. MAGNETIC FASTENING (OPTIONAL)

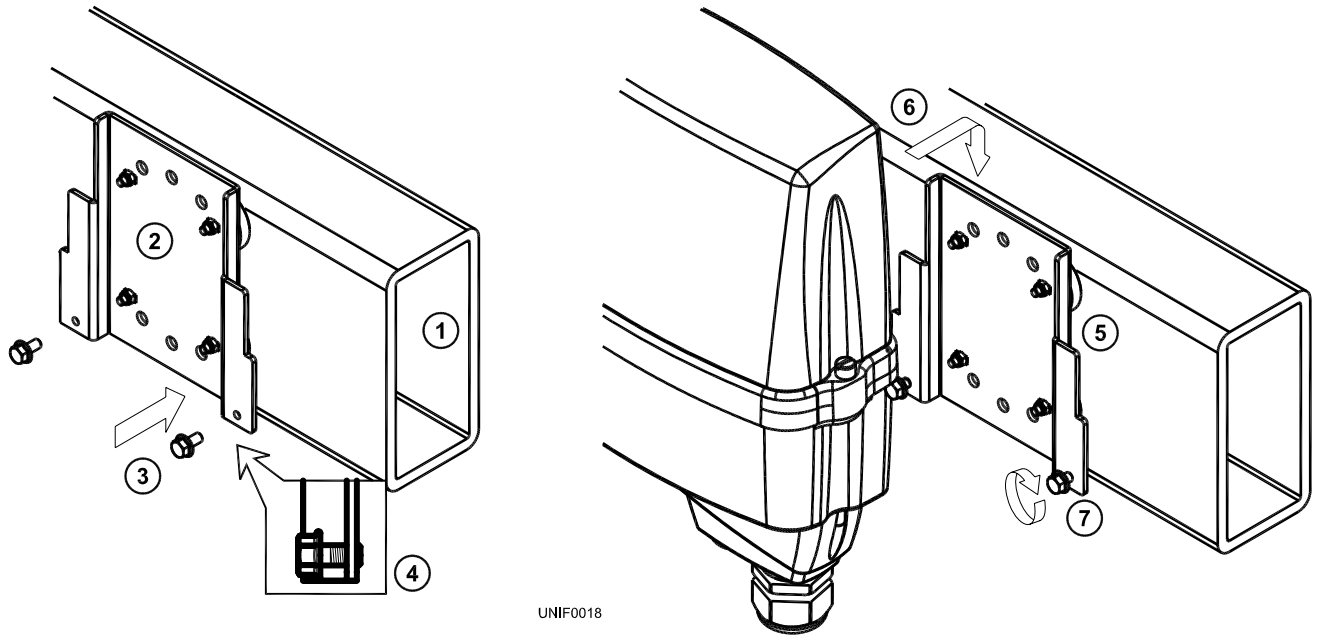
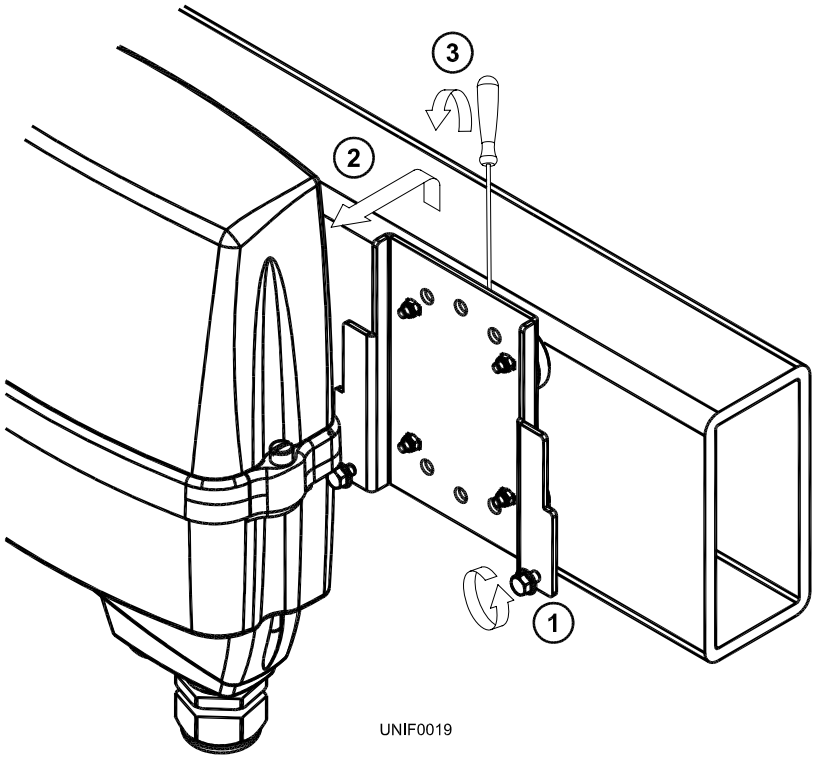


Fig. 5.2 Magnetic fastening

1. Thread the screws M6 DIN 6921 (3) on the fastening, leaving enough space to fit the fastening eye mountings of the set (4)
2. Place the magnetic fastening (2) on the metal structure of the machine (1) WITH A MINIMUM THICKNESS OF 4 MM and where the four magnets contact the flat surface.
3. After assembling the fastening set on the machine (5), slide the receiver along the rails down to the end (6)
4. Finally, tighten the screws M6 DIN 6921 (7) with a no. 10 flat spanner.

ATTENTION: AFTER INSTALLATION, CHECK THAT THE SET IS FIRMLY FASTENED AND THAT IT DOES NOT SLIDE.



Due to the magnetic force of the magnets, follow these instructions to remove the set:

1. Loosen the screws M6 DIN 6921M6 (1) with a no.10 flat spanner.
2. Remove the receiver (2).
3. Pry with a flat screwdriver between the metal structure of the machine and the magnetic fastening (3).

5.2. CONNECTING THE SET

It is recommended to connect the set with a standard multi-cable flexible hose used to connect push-button boxes by cable. This hose will be connected to the set at one end, by means of the supplied Itowa connector, and the other end will be connected to a multi-pole connector identical to the one used by the machine to interconnect with a push-button box by cable. This enables the remote control or the cable control to be interchanged simply by connecting or disconnecting the flexible hose.

ATTENTION: THE HORN RELAY SHOULD NOT BE CONNECTED TO CONTROL ANY OTHER MANOUVRE UNLESS OTHERWISE INDICATED.

The common manoeuvre lead should have a suitable diameter, not over 2.5 mm Ø or less than 1 mm Ø, nor should two 0.75 mm Ø cables be placed. The common manoeuvre leds should not, under any circumstances, be less than the diameter of the manoeuvre leads.

5.3. POWER SUPPLY OF THE RECEIVER

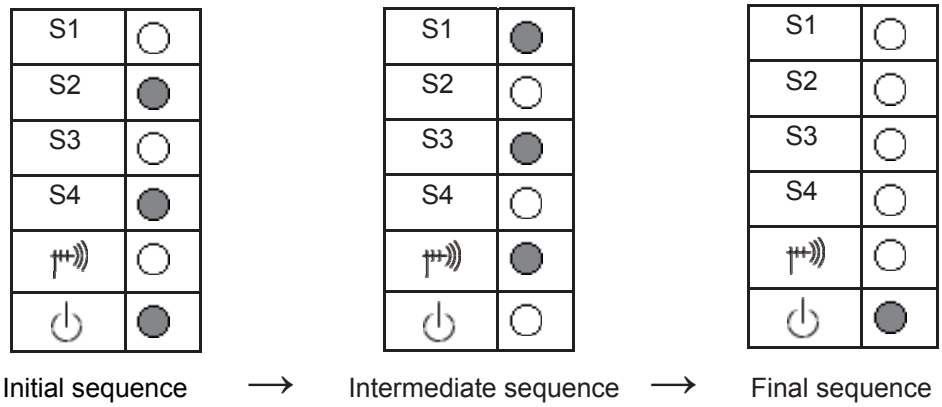
ATTENTION: CONNECTIONS SHOULD BE MADE SO THAT WHEN GENERAL SWITCH IS TURNED OFF, THE REMOTE CONTROL RECEIVER IS ALSO TURNED OFF.

The receiver can be connected internally to three different voltages (230 Vac, 115 Vac, or 48 Vac), except the BETON receiver that connects to a set voltage of 24 Vdc or 12 Vdc, depending on the model. It is essential to ensure that the selector is in the correct position in accordance with the voltage to be supplied to the receiver, before connecting the set. All receivers leave the factory with the voltage pre-set at 115 Vac, but as a precautionary measure, it is advisable to check that the voltage is correctly selected.

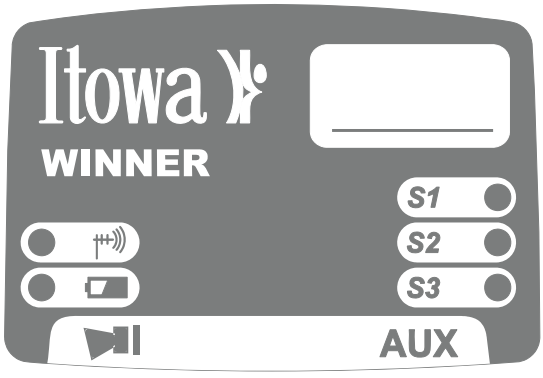
ATTENTION: AS A SAFETY MEASURE, MAKE SURE THE UNIT IS EARTHED WITH THE CORRESPONDING PIN OF THE CONNECTOR.

5.4. START-UP

Once the receiver is installed and when the general switch of the machine is turned on, the leds on the front of the set will sequentially light up as a test. The function of each led changes depending on the state of the receiver, but in this case, they only indicate the check control of the receiver.



Insert a charged battery. As regards Winner, the leds on the transmitter will blink sequentially as a test. In case there should be a problem in the EEPROM of the transmitter, the led S1 would blink intermittently.



UNIF0020

Switch off the emergency stop button (STOP BUTTON). When the START push-button is pressed, the remote control will start to operate by turning on the stop and start relays, and the general contactor will be interlocked. The led of the transmitter and the S1 led of the receiver (Operation led) will light up indicating that the remote control is in operating mode. From this moment, if any button is pressed, the corresponding manoeuvre will be activated. The selected operation will remain active while the push-button is pressed. Whenever a change in the state of one or several relays occurs, the S2 led (relay led) will flash quickly. If there is no change, the led will remain off.

To keep the radio channel free and avoid the operator from accidentally leaving the machine on when not in use, the remote control is equipped with an automatic shut off system. This system is activated 180 seconds (standard setting) after not operating, and sends a shut off command to the receiver, causing the remote control to stop working and the machine to shut off.

When the machine shuts off, the frequency channel in which the set is working will be displayed by means of pulses in the leds and of the receiver. Display starts with pulses of tens through led and continues indicating the units through led . In cases when the value of tens or units is zero, display of this led will be omitted. The following chapter gives a more detailed explanation of this display.

5.4.1. CONFIGURATION OF TRANSMITTING TIME

The automatic stop time of 180 seconds can be set by the push-button, and the time can be changed between three values. To make this change:

1. Lock the STOP BUTTON and place the *switch / key* in the OFF position or remove the battery.
2. Press the push-button / joystick of UNITS or TENS. While keeping them pressed, place the key / switch in the ON position (or insert the battery if they are already in the ON position).
3. Wait between 3 and 5 seconds and then release the STOP BUTTON.
4. Release TENS or UNITS and press again.
5. The leds and will flash simultaneously from one to three times indicating the set time, which could be:
   - Mode 1: 180 seconds (one flash).
   - Mode 2: 330 seconds (two flashes).
   - Mode 3: continuous transmission (three flashes).

Repeat the sequence successively to go from one mode to another in a cyclic manner.
To reactivate the transmitter, the START button should be pressed.
To activate the emergency stop, simply press the STOP BUTTON. This will deactivate all the relays activated and the initial message will be displayed in the leds after the working channel is displayed, through leds and .

ATTENTION: REMEMBER THAT PRESSING THE STOP BUTTONS IS THE SAME AS STOPPING THE REMOTE CONTROL. THIS MEANS THAT ANY ACTIVATED RELAY OF THE RECEIVER IS DEACTIVATED.

5.4.2. STATE OF BATTERIES

The transmitter is equipped with a led indicating the state of the battery. When it detects that the battery is at a certain level of discharge, the led will start to flash and the horn relay will turn on intermittently (reserve). After about 10 minutes, the transmitter turns off and the light of the led stays on (flat battery).

When the battery is in reserve, it is recommended to replace it with the second battery and put the first one to charge.

ATTENTION: IF THE BATTERY IS IN RESERVE, THE CHANGE MODE, THE KEYBOARD LOCK OR THE AUTOMATIC SHUTDOWN TIME CANNOT BE CHANGED.

6. MAINTENANCE OF RADIO CONTROL EQUIPMENT

The equipment you have purchased is manufactured using top quality materials ensuring perfect working order and operation of the remote control. Similarly to all machinery or equipment, the remote control requires minimum basic maintenance tasks that should be performed. In order to increase the life span of the apparatus and avoid unnecessary repair costs, we advise you to carefully follow these preservation and maintenance recommendations.

- Do not knock the set.
- Use the fastening accessories and shoulder strap suitably and adjust them so that using the set is comfortable and safe.
- Although the set has a high level of water tightness (IP65), it should not be totally or partially submerged and should not be left in the rain.
- It is recommended not to leave the set exposed to the sun.

As a general rule, it is advisable to periodically service the sealing devices that protect both the receiver and transmitter from weathering. Servicing should be carried out by an ITOWA authorised Technical Assistance Service, as incorrect sealing may cause irreparable damage to the equipment.

6.1. MAINTENANCE OF THE TRANSMITTER

ATTENTION: BEFORE HANDLING THE TRANSMITTER, TURN OFF THE GENERAL SWITCH OF THE MACHINE.

The transmitter requires minimum maintenance. The good condition of the transmitter should be checked paying special attention to joints and rubber protections of the push-button, selectors or joystick. They should be replaced immediately if they have been cut or damaged as a result of incorrect use of the apparatus.

Check the contacts of the battery holder ensuring that they are clean and free of rust, and that the spring return force is correct.

ATTENTION: DAMAGED RUBBER OF PUSH BUTTONS SHOULD BE REPLACED IMMEDIATELY, OTHERWISE WATER MAY DAMAGE THE TRANSMITTER.

6.2. MAINTENANCE OF THE RECEIVER

Maintenance of the receiver is identical to the transmitter. The following parts must be checked:

- The antenna connection (check that it is clean and free of rust).
- The connection between the receiver and electrical equipment of the machine.
- Contacts of the manoeuvre relays (check that they are clean and free of coal dust).
- The correct working order of the active and passive safety circuits.
- The correct working order of the led display messages.
- The receiver cover and packing gland should be properly sealed.
- The firm fastening of the whole unit.

To check the working order of the active safety circuit, simply press the STOP BUTTON while the remote control is on. The general contactor should drop immediately.

To check the working order of the passive safety circuit, remove the battery from the transmitter and the general contactor should drop within 1.9 seconds.

6.3. MAINTENANCE OF THE CHARGER

Maintenance of the charger is carried out at a similar frequency to the set. The following parts should be checked:

- Contacts and battery holders (which should be clean and free of rust).
- Springs (ensure that they are enough taut to guarantee contact).

ATTENTION: IF YOU DETECT ANY ANOMALY IN THE WORKING ORDER OF THE SET, IT SHOULD BE IMMEDIATELY SWITCHED OFF. REPAIRS SHOULD BE CARRIED OUT BY A TECHNICAL SERVICE AUTHORISED BY ITOWA.

ORIGINAL ITOWA SPARE PARTS SHOULD ALWAYS BE USED. IT IS NOT PERMITTED TO ALTER THE SPECIFICATIONS OF THE RADIO FREQUENCY SYSTEM OR THE CIRCUITS INVOLVED IN THE SAFETY SYSTEMS.

If you have any doubt or enquiry, contact our Technical Assistance Service or any of our authorised technicians.

6.4. CHARGING THE BATTERIES

The batteries supplied with ITOWA equipment do not have a memory effect, meaning that they can be charged without having to the totally flat. In order to lengthen their life span, it is recommended to use one battery in the morning and another in the afternoon. One battery can then be charged while the other is being used.

7. DISPLAYING THE CODE AND THE WORKING CHANNEL OF THE SET

7.1. DISPLAY OF CODE

If you want to know the code of the set, the receiver can display it by simply following a series of steps.

To start displaying, the set should be in stand-by. Press the push-button located on the base plate of the receiver for 1 to 2 seconds, and the sequence will start. The code will be divided into 6 characters expressed in hexadecimal system. By observing the following table, you will be able to know the number displayed through the leds depending on the character to be expressed:

Code character (Hexadecimal value)	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Number of pulses (Decimal value)	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

For each of the 6 characters to be displayed, one of the leds will be used, and this led will give as many pulses indicated by the corresponding character of the code. If it starts by S1 with the first character of the code (reading from left to right) and ends with which displays the last character of the code.
To indicate that the display of the character has ended, all the leds will flash once (short pulse) except the one which is displaying. This sequence will be repeated continuously until the push-button is pressed for 1 to 2 seconds, to pass on to the next character.

Follow the same procedure for the remaining characters until the 6 characters of the code of the set have been displayed, and the receiver will return to stand-by.
If at any time during the display process the receiver receives a start-up order from the transmitter, displaying will end and it will pass on to the working mode.

To understand this process better, an example of a code and the result of the display is given.

The code of the example is: *01A38E*.

Led	S1	S2	S3	S4		
Code	0	1	A	3	8	E
Number of led pulses	0	1	10	3	8	14

The sequence of the example would be:

- All leds flash.
- All leds flash except S1 until P1 is pressed.
- One pulse of S2 and all the leds flash except S2 until P1 is pressed.
- 10 pulses of S3 and all the leds flash except S3 until P1 is pressed.

- 3 pulses of S4 and all the leds flash except S4 until P1 is pressed.
- 8 pulses of S5 and all the leds flash except S5 until P1 is pressed.
- 14 pulses of S6 and all the leds flash except S6 until P1 is pressed.
- The display of the code of the set finishes when P1 is pressed.

7.2. DISPLAY OF WORKING CHANNEL

It is important to know the working channel the equipment is working with. This will allow us either to change the frequency or to detect interferences of other equipments within the communication of our transmitter and receiver.
Both the transmitter and the receiver can display the working channel, always that the equipment is not working.

The following steps will allow us to know the working channel on the transmitter.

- Unlock the STOP BUTTON.
- Remove the key/turn off the selector switch or remove the battery.
- Press the START BUTTON and either turn on the key to on position (maintaining the stop button pressed) or insert the battery.
- When unreleasing the start button the leds and will display the working channel.
  - First the led will blink as many times as tens the working channel has. In case of being zero, the led will not blink.
  - Afterwards the led will blink as many times as units the working channel has. In case of being zero, the led will not blink.
  - Once tens and units have been displayed, the equipment can be started up.

The following steps will allow us to known the working channel on the receiver.

- Start up the receiver, unreleasing the mushroom head on the transmitter and press start.
- Release the mushroom head in order the equipment is in stand by. At this moment, the receiver will display the working channel by means of the leds (in a similar way the trasmitter display it).
- First the led will blink as many times as tens the working channel has. In case of being zero, the led will not blink.
- Afterwards the led will blink as many times as units the working channel has. In case of being zero, the led will not blink.
- If the users tries to start up the equipment while the channel is being displayed, then the display will stop and the equipment will be started.
- Another way of knowing the working channel is at the moment to give power supply to the equipment. After the test of leds the equipment will show the working channel.

After having changed the frequency, both the trasmitter and the receiver will display the working channel.

8. SCAN

The equipment has several systems for the detection of abnormalities in case other equipments or systems may interfere within the communication between transmitter and receiver.

Among these systems there is the scanning or frequencies, which will allow the tracking of the whole band in order to find which channels are or have been occupied by any other system that transmits in the same band.

The equipment is able to find the channels that are or have been occupied. This means that the user can deduce which channels are free. In order to avoid abnormalities, it may be convenient to select one of these free channels as working channel.

8.1. AUTOMATIC SCAN

The equipment makes an exploration of the free and occupied channels of the band while it is in stand by state. In case the selected channel might be occupied, the equipment will prove if it is the own one or if it belongs to another equipment. In case the equipment accepts the selected channel, the new configuration will be updated and the equipment will work in this new channel.

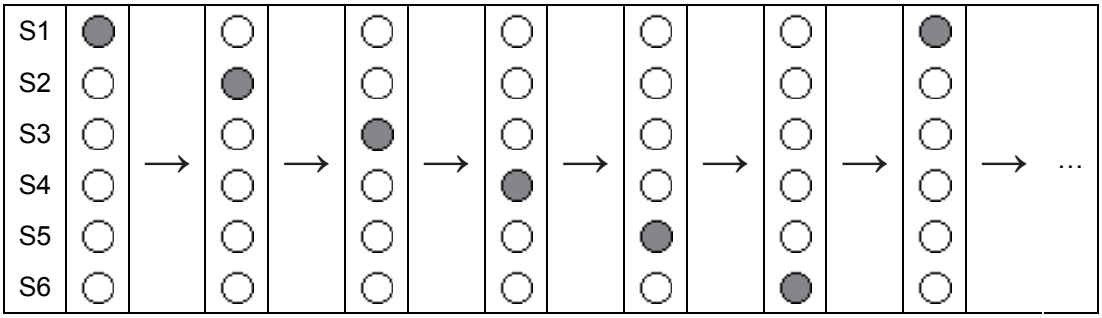
If the scanned channel is not recognised by the equipment, the equipment will simply register it as occupied or free.

The occupied state of the channel will prevail over the free one, that is, whenever a channel is occupied it will be registered as occupied even though in later scans it will be find free. This register will be erased when the receiver has no power supply.

8.2. MANUAL SCAN

The manual scanning is used in order to have information about those free channels that are not being occupied by any other equipment. These free channels can be used without interferences from other equipments.

In order to activate this command the receiver must be in stand by. The push-button on the base board must be pressed during more than two seconds. Leds will light sequentially and cyclically with intervals of half a second approximately between each state, indicating that the scanning process is being realised the following board indicates the process:



The scanning process lasts around half a minute. Once it has ended leds will no longer realize this visualization and free channels will be shown. These channels are the result of the current scanning process plus any other scanning processes undergone while the equipment is in rest from the latest reset (last time the receiver has been given power supply).

The channels will be indicated though leds and using the same systems as to indicate the working channel. Free channels will be indicated sequentially, separated by a flash in which all led a will light.

The order is as follows:

- The first channel shown will be the smallest free one.
- 11 units will be added to the next channel to be shown (always that the band may allow it).
- If the result is superior than the channels in the band, the maximum of channels in the band may be subtracted.
- If the channel is not free, it is not shown and next one with the same order is shown.

In order the user may understand it better, find below an example of visualization of the band 868MHz:

- In case all channels were free, the result may be as follows:

  1 ► 12 ► 23 ► 34 ► 45 ► 56 ► 67 ► 78 ► 8 ► 19 ► 30…

- In case the channels may be occupied, the results may be as follows:

  1 ► 12 ► 45 ► 56 ► 67 ► 78 ► 19 ► 30…

The visualization of channels may be cyclic and it will end once the last free channel is found, the equipment is set up or a manual scanning may be commanded.

9. CHANGING THE WORKING FREQUENCY (NOT VALID FOR GCFI VERSIONS)

ATTENTION: THE WORKING FREQUENCY SHOULD ONLY BE CARRIED OUT BY AUTHORISED STAFF.

9.1. OPERATION MODE

The system can operate in three modes:

- Mode 1: change of frequency disabled.
- Mode 2: change of frequency in manual mode.
- Mode 3: change of frequency in automatic mode.

ATTENTION: THE EQUIPMENT IS DELIVERED WITH THE CHANGE OF FREQUENCY IN AUTOMATIC MODE.

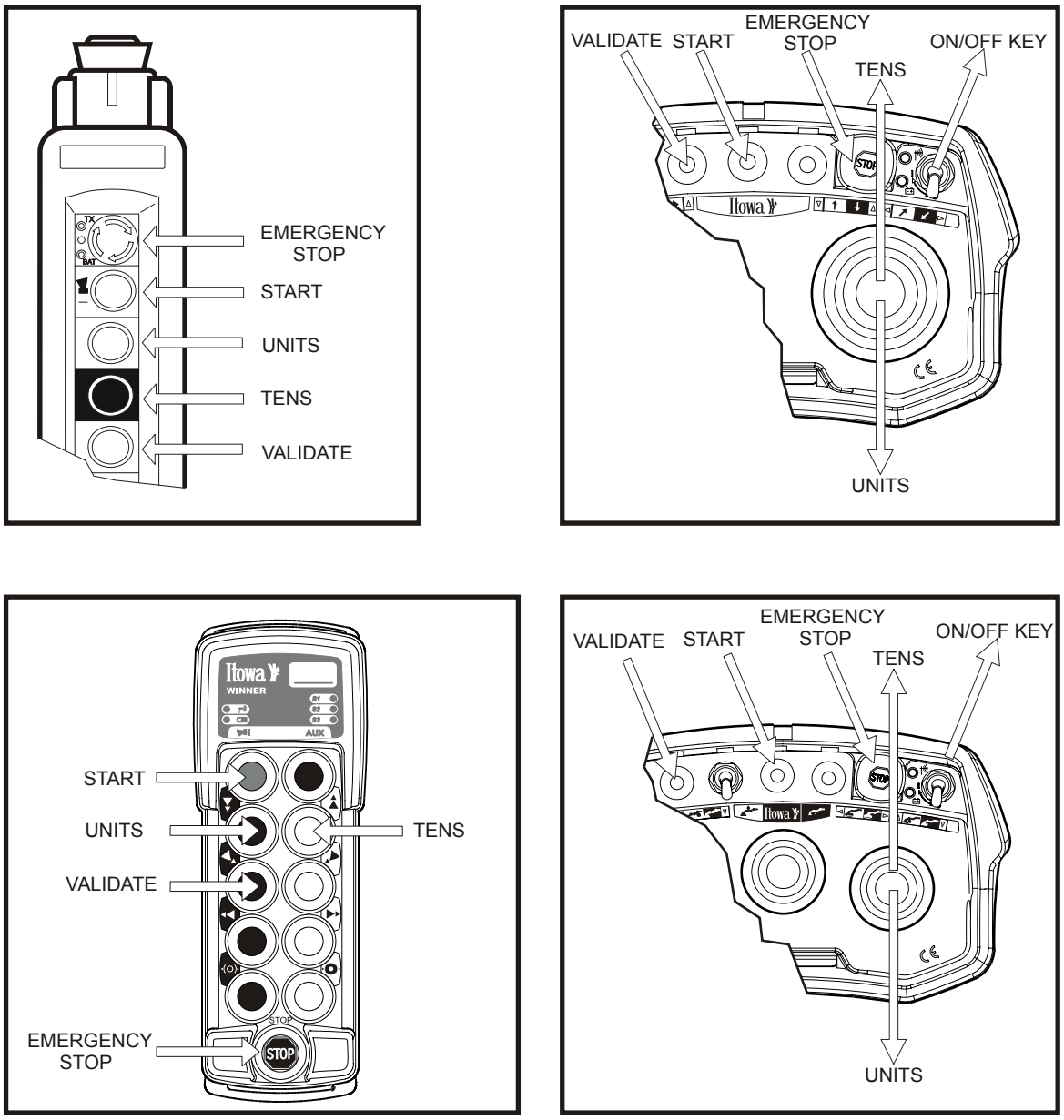
Changing the operation mode:

1) Unlock the STOP BUTTON* and remove the key or turn off the selector switch (or battery).
2) Press the START and UNITS buttons (in COMPACT and BOGGY models) or the START BUTTON and RIGHT JOYSTICK in the UNITS position (in COMBI and BETON models) at the same time. Keep them pressed and insert and turn the key or turn on the selector switch (or insert the battery). Leds and will flash simultaneously from one to three times, indicating the operation mode that has been programmed, which can be:

   - Mode 1: change of frequency disabled (one flash).
   - Mode 2: change of frequency in manual mode (two flashes).
   - Mode 3: change of frequency in automatic mode (three flashes).

Keep the start button pressed, and each time units button or joysticks are activated mode will be changed successively from mode 1 (change of frequency disable) to mode 2 (change of frequency in manual mode), from mode 2 to mode 3 (change of frequency in automatic mode), from mode 3 again to mode 1, etc.

* Except in Winner emitter, where the STOP BUTTON must be locked.



UNIF0021

Fig. 9.1 Elements to change frequency

ATTENTION: TO CHANGE THE WORKING FREQUENCY, SELECT THE MANUAL OR AUTOMATIC FREQUENCY CHANGE MODE.

The system operates in the UHF band in frequencies from 433.050 MHz to 434.775 MHz, or from 868.000 MHz to 870.000 MHz, depending on the model you have purchased, and meets the telecommunications and safety regulations I-ETS 300-220. (See channel assignation tables).

9.2. PROCEDURE TO AUTOMATICALLY CHANGE FREQUENCY

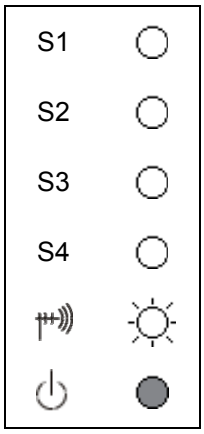
ATTENTION: TO AUTOMATICALLY CHANGE FREQUENCY, THE AUTOMATIC CHANGE OF FREQUENCY MODE SHOULD BE SELECTED (MODE 3).

To automatically change the working frequency, the following steps should be carried out on the transmitter:

1. If you are working with the remote control, as a safety measure, remove the transmitter battery to disconnect the equipment.

2. Insert a charged battery. It is not possible to change frequency with a discharged battery.

3. Make sure the receiver is ready for operating. The leds will display the following message, indicating that there is voltage and that it does not detect the channel occupied by another system:

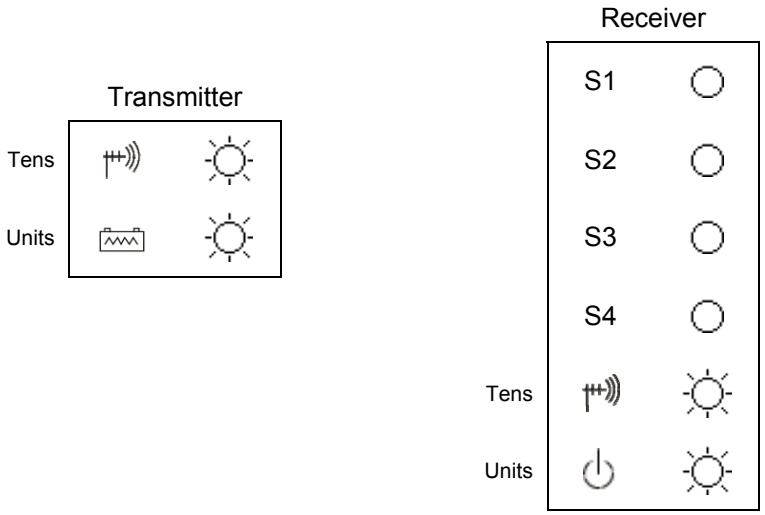


ATTENTION: PLACE THE TRANSMITTER AT THE BOTTOM OF THE CRANE.

4. If the STOP BUTTON is pressed, it should be released.

5. Press the START BUTTON. Keep it pressed and press the STOP BUTTON. The equipment selects a new frequency automatically and the selected channel is sent to the receiver, which will indicate it by means of the leds.

In order to indicate it, the transmitter will use both leds and . First, there are as many flashes on the led a tens and afterwards there are as many flashes on the led as units. In the receiver a similar sequence is produced. Led is used to visualise tens and is used to visualise units.



The frequency has been changed correctly. Led indicators and will have stopped flashing. The equipment is ready to start operating. If the frequency has not been changed correctly, repeat the process until the receiver picks up a new channel.

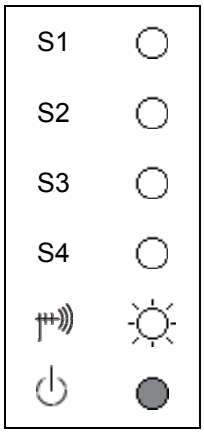
After changing the working channel, in order to continue operating with the radio control, release the emergency stops button (STOP BUTTON) and press the START push button. In the receiver, the S1 indicator will activate, indicating that the stop and start relays are activated. As a consequence, remote control is operating correctly and all manoeuvres can be performed.

9.3. PROCEDURE TO MANUALLY CHANGE FREQUENCY

ATTENTION: TO MANUALLY CHANGE FREQUENCY, THE MANUAL CHANGE OF FREQUENCY MODE SHOULD BE SELECTED (MODE 2).

To manually change the working frequency, the following steps should be carried out on the transmitter:

1. If you are working with the remote control, as a safety measure, remove the transmitter battery to disconnect the equipment.
2. Insert a charged battery. It is not possible to change frequency with a discharged battery.
3. Make sure the receiver is ready for operating. The leds will display the following message display, indicating that there it voltage and the last channel in which you were working:



ATTENTION: PLACE THE TRANSMITTER AT THE BOTTOM OF THE CRANE.

4. If the Stop Button is pressed, it should be released.

5. Press the START button. Keep it pressed and press the STOP BUTTON. Led indicators and on the transmitter will flash alternately. The receiver will indicate that the new working channel is on stand-by:

You now have 60 seconds to enter the new working channel. After this time, the unit will exit the programming mode and will keep the previous channel, which will be visualised by means of the leds.

6. Enter the channel number, 27 for example, by pressing the master control or moving the joystick corresponding to tens twice and seven times corresponding to units. Press VALIDATE.

7. The selected channel is sent to the receiver, which will indicate the new channel by means of the leds:

The frequency has been changed correctly. Leds indicators and will have stopped flashing. The equipment is ready to start operating.

After changing the working channel, in order to continue operating with the radio control, release the emergency stop button (STOP BUTTON) and press the START push button. In the receiver, the stop and start relays will activate, and the general contactor will there before be interlocked. At the same time, the S1 indicator of the transmitter will turn on indicating that the remote control is operating correctly and all manoeuvres can be performed.

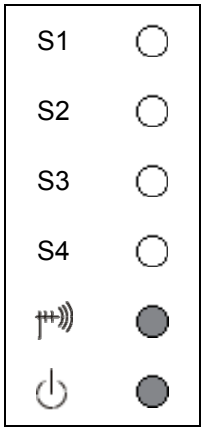
NOTE: If you have started changing the frequency in manual mode and the push-button is validated without having entered the units or tens, the remote control unit will automatically select the first channel of the table

9.4. CHECKING THE SELECTED CHANNEL

After changing the frequency, it is advisable to check that the selected channel is not already occupied. Carry out the following operations:

1. Turn off the transmitter by pressing the STOP BUTTON.

2. If the channel occupied, the following message will appear:



In this case, it is necessary to change the new transmitting channel as many times as necessary until we find a free channel. This will avoid abnormalities in the functioning of the machine.

9.5. FREQUENCY TABLE

9.5.1. CHANNELS IN THE 433 MHZ BAND

Channel 1: 433.050 MHz	Channel 25: 433.650 MHz	Channel 49: 434.250 MHz
Channel 2: 433.075 MHz	Channel 26: 433.675 MHz	Channel 50: 434.275 MHz
Channel 3: 433.100 MHz	Channel 27: 433.700 MHz	Channel 51: 434.300 MHz
Channel 4: 433.125 MHz	Channel 28: 433.725 MHz	Channel 52: 434.325 MHz
Channel 5: 433.150 MHz	Channel 29: 433.750 MHz	Channel 53: 434.350 MHz
Channel 6: 433.175 MHz	Channel 30: 433.775 MHz	Channel 54: 434.375 MHz
Channel 7: 433.200 MHz	Channel 31: 433.800 MHz	Channel 55: 434.400 MHz
Channel 8: 433.225 MHz	Channel 32: 433.825 MHz	Channel 56: 434.425 MHz
Channel 9: 433.250 MHz	Channel 33: 433.850 MHz	Channel 57: 434.450 MHz
Channel 10: 433.275 MHz	Channel 34: 433.875 MHz	Channel 58: 434.475 MHz
Channel 11: 433.300 MHz	Channel 35: 433.900 MHz	Channel 59: 434.500 MHz
Channel 12: 433.325 MHz	Channel 36: 433.925 MHz	Channel 60: 434.525 MHz
Channel 13: 433.350 MHz	Channel 37: 433.950 MHz	Channel 61: 434.550 MHz
Channel 14: 433.375 MHz	Channel 38: 433.975 MHz	Channel 62: 434.575 MHz
Channel 15: 433.400 MHz	Channel 39: 434.000 MHz	Channel 63: 434.600 MHz
Channel 16: 433.425 MHz	Channel 40: 434.025 MHz	Channel 64: 434.625 MHz
Channel 17: 433.450 MHz	Channel 41: 434.050 MHz	Channel 65: 434.650 MHz
Channel 18: 433.475 MHz	Channel 42: 434.075 MHz	Channel 66: 434.675 MHz
Channel 19: 433.500 MHz	Channel 43: 434.100 MHz	Channel 67: 434.700 MHz
Channel 20: 433.525 MH	Channel 44: 434.125 MHz	Channel 68: 434.725 MHz
Channel 21: 433.550 MHz	Channel 45: 434.150 MHz	Channel 69: 434.750 MHz
Channel 22: 433.575 MHz	Channel 46: 434.175 MHz	Channel 70: 434.775 MHz
Channel 23: 433.600 MHz	Channel 47: 434.200 MHz	
Channel 24: 433.625 MHz	Channel 48: 434.225 MHz	

Channels valid only in some countries.

Channels valid in C.E.E.

9.5.2. CHANNELS IN THE 868 MHZ BAND

Channel 1: 868.000 MHz	Channel 28: 868.675 MHz	Channel 55: 869.350 MHz
Channel 2: 868.025 MHz	Channel 29: 868.700 MHz	Channel 56: 869.375 MHz
Channel 3: 868.050 MHz	Channel 30: 868.725 MHz	Channel 57: 869.400 MHz
Channel 4: 868.075 MHz	Channel 31: 868.750 MHz	Channel 58: 869.425 MHz
Channel 5: 868.100 MHz	Channel 32: 868.775 MHz	Channel 59: 869.450 MHz
Channel 6: 868.125 MHz	Channel 33: 868.800 MHz	Channel 60: 869.475 MHz
Channel 7: 868.150 MHz	Channel 34: 868.825 MHz	Channel 61: 869.500 MHz
Channel 8: 868.175 MHz	Channel 35: 868.850 MHz	Channel 62: 869.525 MHz
Channel 9: 868.200 MHz	Channel 36: 868.875 MHz	Channel 63: 869.550 MHz
Channel 10: 868.225 MHz	Channel 37: 868.900 MHz	Channel 64: 869.575 MHz
Channel 11: 868.250 MHz	Channel 38: 868.925 MHz	Channel 65: 869.600 MHz
Channel 12: 868.275 MHz	Channel 39: 868.950 MHz	Channel 66: 869.625 MHz
Channel 13: 868.300 MHz	Channel 40: 868.975 MHz	Channel 67: 869.650 MHz
Channel 14: 868.325 MHz	Channel 41: 869.000 MHz	Channel 68: 869.675 MHz
Channel 15: 868.350 MHz	Channel 42: 869.025 MHz	Channel 69: 869.700 MHz
Channel 16: 868.375 MHz	Channel 43: 869.050 MHz	Channel 70: 869.725 MHz
Channel 17: 868.400 MHz	Channel 44: 869.075 MHz	Channel 71: 869.750 MHz
Channel 18: 868.425 MHz	Channel 45: 869.100 MHz	Channel 72: 869.775 MHz
Channel 19: 868.450 MHz	Channel 46: 869.125 MHz	Channel 73: 869.800 MHz
Channel 20: 868.475 MHz	Channel 47: 869.150 MHz	Channel 74: 869.825 MHz
Channel 21: 868.500 MHz	Channel 48: 869.175 MHz	Channel 75: 869.850 MHz
Channel 22: 868.525 MHz	Channel 49: 869.200 MHz	Channel 76: 869.875 MHz
Channel 23: 868.550 MHz	Channel 50: 869.225 MHz	Channel 77: 869.900 MHz
Channel 24: 868.575 MHz	Channel 51: 869.250 MHz	Channel 78: 869.925 MHz
Channel 25: 868.600 MHz	Channel 52: 869.275 MHz	Channel 79: 869.950 MHz
Channel 26: 868.625 MHz	Channel 53: 869.300 MHz	Channel 80: 869.975 MHz
Channel 27: 868.650 MHz	Channel 54: 869.325 MHz	Channel 81: 870.000 MHz

Channels valid only in some countries.

Channels not used (social alarms).

Channels valid in C.E.E.

10. TROUBLESHOOTING

INCIDENT	SITUATION	ACTION
The set does not start-up	Neither of the transmitter indicators and light up	Check the condition of the key or that the selector is in the ON position
		Battery is correctly inserted
		Ensure that the battery is charged or replace it with a charged battery
	Only the led of the transmitter light up	The battery is flat and should be replaced with a charged battery
	The led on the transmitter switch on, but in the received the led is off (not applicable to GCFI versions)	Check that the channel on the transmitter and the receiver is the same
		In case the channel is not the same or if you don't know, keep activated the on push button on the transmitter till the RX get on (Max. 1 minute). Make it the nearest you can to the RX
	Both leds and of the transmitter flash	Keyboard of transmitter is locked. Follow the section "Looking the keyboard to unlock it
	The led of the transmitter flashes	A channel is active. Check that all actuators of the transmitter are in the stand-by position
	One of the leds of the transmitter flashes quickly trice and then pauses	A contact of the STOP BUTTON is faulty. Contact the Technical Assistance Service
	Led S2 of the Rx i son or flashes and the stop relays are not locked	Fault in standard drivers or stop relays. Contact the Technical Assistance Service
	Led S4 of the Rx generates quick pulses	Fault of the eeprom. Check that it is inserted in its socket in the RX. If it is and it still doesn't work, contact the Technical Assistance Service
After making a change of channel, the machine is not working	The led switch on, but the RX is not working	Keep active the Start push button on the receiver till it starts (Max. 1 minute). Make it the nearest you can to the RX
	The transmitter in pause the receiver continues with the led switched on	There are interferences in the new channel, you must charge to another one. If you do not receive the new channel on the receiver, you must keep pressed on the transmitter the Start pushbutton. (Max. 1 minute). Make it the nearest you can to the RX.
The transmitter do not allow to make the change of frequencies	The lights and do not blink alternately	Verify the battery's charge
		Check the mode change of frequency configured

INCIDENT	SITUATION	ACTION
Mistaken introduction of the work of channel in a change of frequency	The Introduced channel of work is not the wanted	Repeat the process with the wanted channel of work
The remote control equipment starts up but the machine does not work	The equipment is not connected to the machine	Connect the cable from the remote control to the electric panel of the machine using the corresponding connectors
	The equipment is connected to the machine, but the machine still doesn't work	The fuse/s of the stop relays has/have blown. They should be replace by new fuses of the same value
	The remote control works but the machine still doesn't work	Place the push-button of the cable/cabin instead of the remote control, and if still doesn't work, the problem is with the
		If the machine works properly with the cable push-button, contact the Technical Assistance Service
The remote control has a short range, and the machine stops, although it can be reset	The antenna is disconnected, broken or in bad condition	Replace the antenna, contact the Technical Assistance Service
	Although the transmitter is disconnected by locking the STOP BUTTON, the led of the receiver is still on	There are interferences from another apparatus you must change the working channel following the steps described on the "Change of frequencies" Chapter
The Travelling manoeuvre does not respond	The ON/OFF travelling push-button is not pressed	Press the Travelling push-button
The equipment randomly switches off or some relays do not turn on, even through the equipment is still on	The leds remains on but makes a quick pulse	Input to the set is under 50% of the nominal value (230V - 115V or 48V).
	The led remains on but makes two quick pulses	Input to the set is under 45% of the nominal value (230V - 115V or 48V)

ATTENTION: ORIGINAL SPARE PARTS SHOULD BE USED FOR ALL REPAIRS, AND SAFETY FEATURES OF THE UHF RECEIVER AND TRANSMITTERS SHOULB NEVER BE CHANGED.

11. QUICK GUIDE

11.1. SUMMARY OF RECEIVER LED FUNCTIONS

MODE	LED
S1	
●	Set on
☀	Slight loss of radio frequency signal
☼	Shutdown owing to lack of radio frequency signal
☼☼	Shutdown owing to interference
○	Shutdown of set owing to time or STOP BUTTON
S2	
○	Stand-by mode or manoeuvre without changes
●	Fault in standard drivers
◑	Fault in stop relays
☼	Flash each mode change of one or more relays
S3	
	No assigned
S4	
○	Eeprom OK.
☼	Error in eeprom, flashes the number of times corresponding to the detected error (see table of errors)
RX	
☼	Set in stand-by
●	Recognised signal with set code received (set does not have to be on)
◑	Radio frequency signal received but it is not recognised as its own
○	Error in radio frequency receiver (If transmitter is on)
Power	
●	Correct input
☀	Low input
☀☀	Insufficient input

Icono	Significado
○	Led off
◑	Slow flashing
☼	Led off with quick flashing on
☼	Led on with quick flashing off
●	Led continuously on

- On starting up the set and as long as it is shutdown with the STOP BUTTON or with time, the working channel is indicated through pulses in the leds and (tens and units).
- Once the band scan has finished, the free channels found will be displayed.
- While the code or channel is displayed, the set can be started up and this display will pass on to the normal start display mode.

11.2. SUMMARY OF THE TRANSMITTER LED FUNCTIONS

MODE	LED
●	Transmitter on
◑	Channel is activated when started-up
☼☼	Fault in contact 1 of the stop button
○	Transmitter off
○	Stand-by mode or battery OK.
◑	Battery in reserve.
●	Flat battery
☼☼	Fault in contact 2 of the stop button

Locking the keyboard

- If the keyboard is locked, both leds flash at the same time as they try to start-up the set.
- Both leds light up for 3 seconds when the keyboard is locked.
- Both leds flash at the same time three times when the keyboard is unlocked.

• To lock and to unlock the keyboard, press the start button 5 times in less than three seconds with the STOP BUTTON pressed.

Change of frequency

• When selecting the manual change of frequency, both leds will blink alternatively until the validation of change of frequency is activated.

• When the process of change of frequency (either manual or automatically) has finalized, the leds will display the new working channel as follow:

• First the led will blink as many times as tens the working channel has. In case of being zero, the led will not blink.

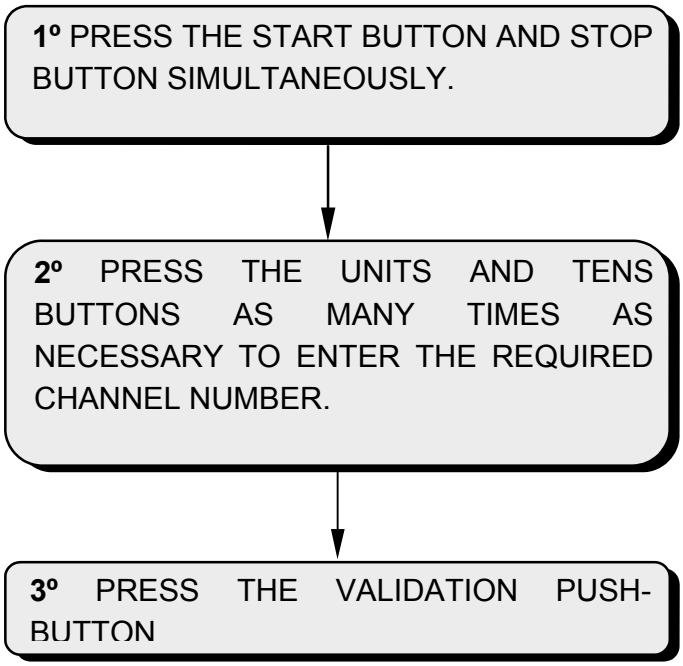
• Afterwards the led will blink as many times as units the working channel has. In case of being zero, the led will not blink.

• Once the working channel has been displayed, the equipment can be started up.

Working channels initial message

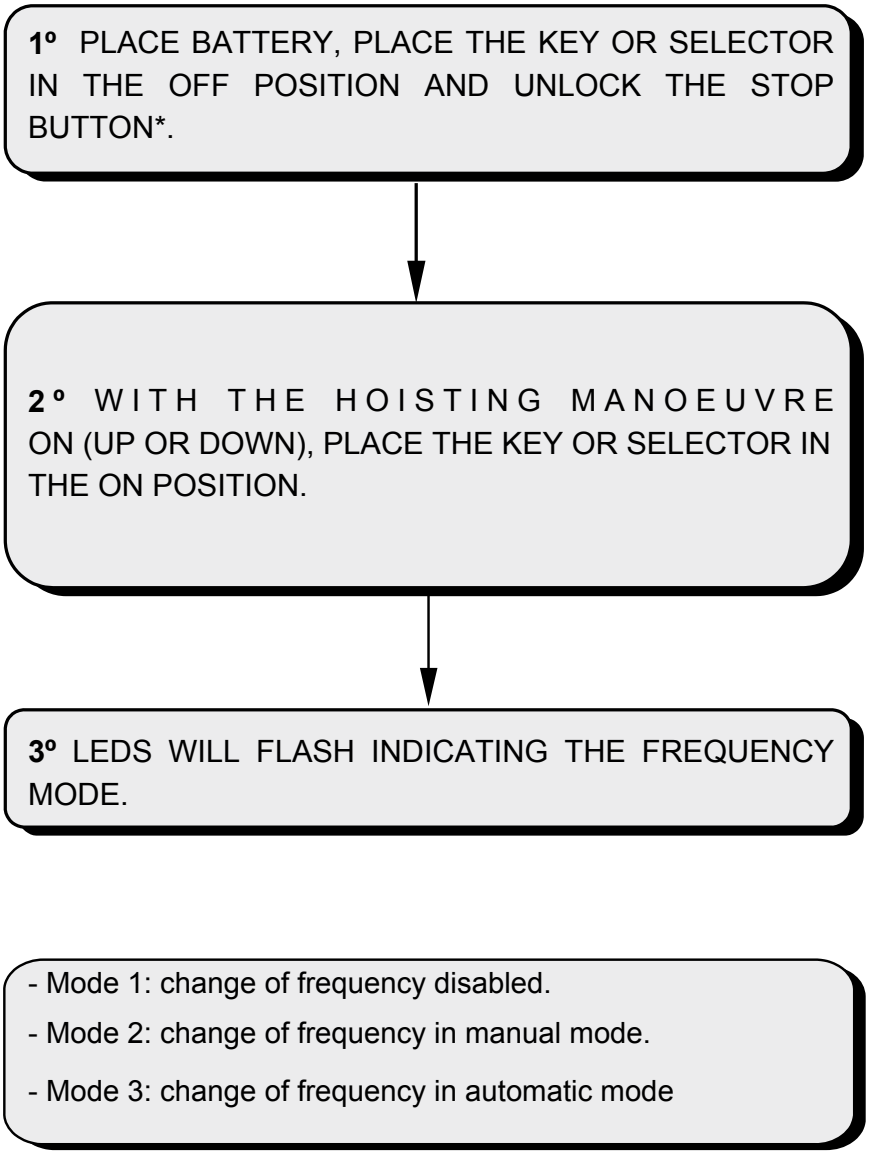
• Insert the battery and turn the key selector to ON position (maintaining the stop button pressed). Then the working channel on the transmitter will be displayed by the leds as indicated in the previous paragraph).

11.3. SUMMARY OF THE CHANGE OF FREQUENCY (NOT VALID FOR GCFI VERSIONS)


1º PRESS THE START BUTTON AND STOP BUTTON SIMULTANEOUSLY.
2º PRESS THE UNITS AND TENS BUTTONS AS MANY TIMES AS NECESSARY TO ENTER THE REQUIRED CHANNEL NUMBER.
3º PRESS THE VALIDATION PUSH-BUTTON

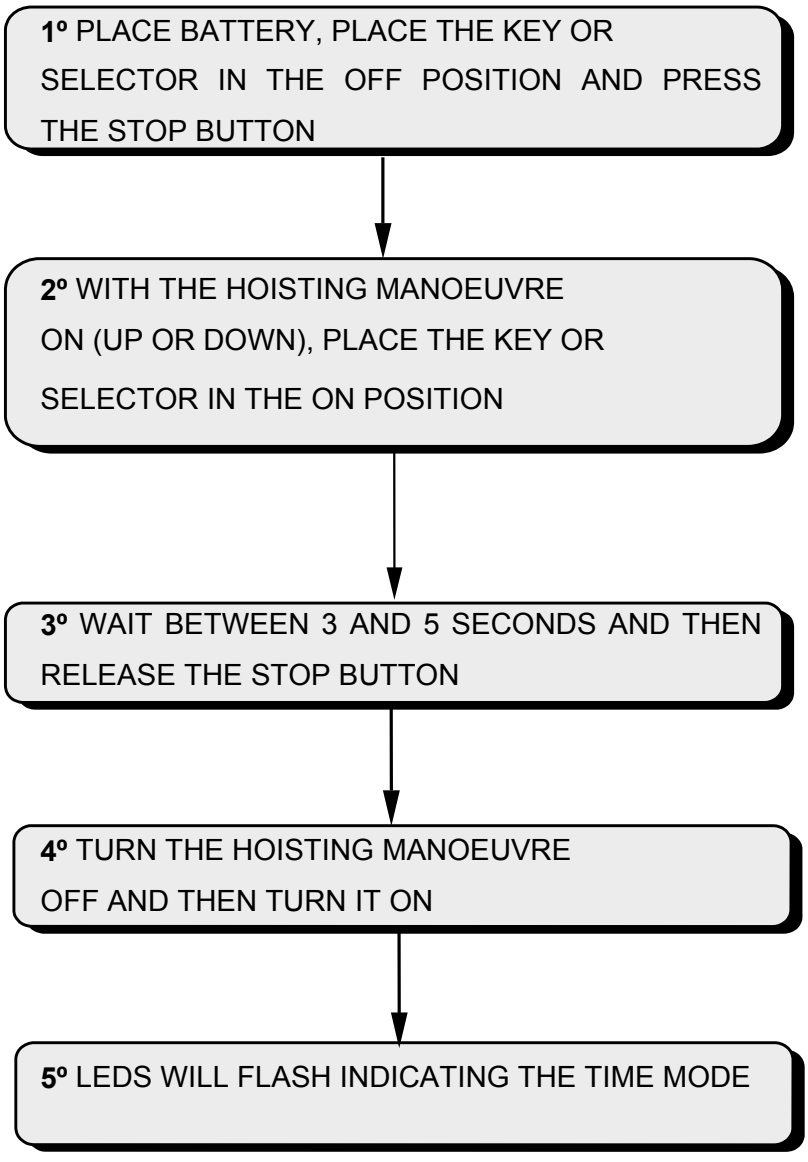
In order to start up the equipment again, unrelease the stop button and press the start button. All manoeuvres can now be performed

11.4. SUMMARY OF THE CHANGE OF FREQUENCY MODE (NOT VALID FOR GCFI VERSIONS)


1º PLACE BATTERY, PLACE THE KEY OR SELECTOR IN THE OFF POSITION AND UNLOCK THE STOP BUTTON*.
2º WITH THE HOISTING MANOEUVRE ON (UP OR DOWN), PLACE THE KEY OR SELECTOR IN THE ON POSITION.
3º LEDS WILL FLASH INDICATING THE FREQUENCY MODE.
- Mode 1: change of frequency disabled.
- Mode 2: change of frequency in manual mode.
- Mode 3: change of frequency in automatic mode

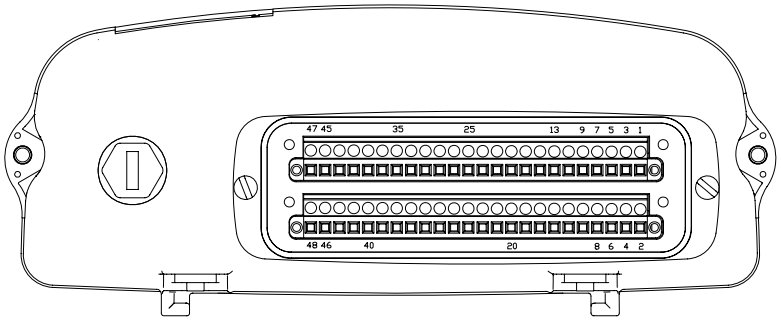
* Except in Winner emitter, where the STOP BUTTON must be locked.

11.5. SUMMARY TO CHANGE THE TRANSMISSION TIME WITH NO ACTIVE CHANNEL


1º PLACE BATTERY, PLACE THE KEY OR SELECTOR IN THE OFF POSITION AND PRESS THE STOP BUTTON
2º WITH THE HOISTING MANOEUVRE ON (UP OR DOWN), PLACE THE KEY OR SELECTOR IN THE ON POSITION
3º WAIT BETWEEN 3 AND 5 SECONDS AND THEN RELEASE THE STOP BUTTON
4º TURN THE HOISTING MANOEUVRE OFF AND THEN TURN IT ON
5º LEDS WILL FLASH INDICATING THE TIME MODE

- Mode 1: 180 seconds (one flash).
- Mode 2: 330 seconds (two flashes).
- Mode 3: cont. transmission (three flashes).

11.6. STANDARD WIRING



RELAY	PIN CONNECTOR
1	Ø5 Ø6 Ø4
2	Ø1 Ø2 Ø3
3	Ø7 Ø10 Ø8
4	Ø9 Ø12
5 6 7 8	Ø15 Ø11 Ø14 Ø13 Ø16
9 10 11	Ø17 Ø18 Ø19 Ø20
12 13	Ø21 Ø22 Ø24

RELAY	PIN CONNECTOR
14	Ø23 Ø26
15	Ø25 Ø28
16	Ø27 Ø30
17	Ø31 Ø32 Ø29
18 19 20 21	Ø33 Ø34 Ø36 Ø38 Ø40
22	Ø37 Ø39 Ø35 Ø42
23 (STOP 1) 24 (STOP 2)	Ø41 43 45 Ø47
(*)	Ø44 N Ø46 L Ø48

* Eligible inside the receiver (48.115.230 Vac)

Attention: If the Stop manoeuvre does not require independent contacts, please connect terminals 43 and 45 by means of a bridge and wire this manoeuvre in terminals 41 and 47.

12. RECYCLING

INFORMATION FOR THE PROPER MANAGEMENT OF ELECTRIC AND ELECTRONIC DEVICES

The equipment's refuses should never be mixed with general refuses.
These refuses can be delivered, without any extra cost, to the centres of refuse collection.
For further information, please contact your local authorities.

To recycle an electronic device separately from the general refuses avoids possible negative consequences for the environment. Furthermore, it allows a proper recycling process for all the pieces. This implies both energy and resources saving.

This symbol is marked in all products. It highlights both the obligation to collaborate with the refuse Collection and the warning of not using traditional containers for the elimination of the products.

For further information, please contact your local authorities.

12.1. PACKAGING

→ The materials used for packaging are recyclable.

→ Please, consider the local norms with regards to the recycling of these products.